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SPECIAL FEATURE STARTING THIS ISSUE!
ACQUISITION IMPROVEMENT UPDATE
BY JOHN A. BETTI
Under Secretary of Defense for Acquisition

PROGRAM
manager

Are you heading for

ORGANIZATIONAL
BANKRUPTCY?

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July-August 1990

Journal of the Defense Systems Management College

Whenever in this publication "man," "men," or their related pronouns appear, either as words or parts of words (other than with obvious reference to named male individuals), they have been used for literary purposes and are meant in their generic sense.

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ACQUISITION IMPROVEMENT UPDATE

As I complete my first year as Under Secretary of Defense for Acquisition, I am reminded of my confirmation hearing before the Senate Armed Services Committee and my response to why I took the job. Let me share with you what I told the Senators. First and foremost, I welcomed the opportunity to serve my country. I also honestly believed the time was right to significantly reform the acquisition process. Senior Department officials were committed, as well as the Congress and industry, and we all agreed change was necessary. Finally, I told the Senators that from a professional standpoint, there were few management challenges in the world that could compare. This is still true today. I have truly enjoyed my time in the Pentagon and continue to be impressed by the capability, dedication, and integrity of the men and women who make up the acquisition community. Change is not only possible—it's happening—and as for the job being challenging, if anything, I think I understated that one.

During the hearing, I described what I believe success would look like. I believed then, as I do today, that real change can only result from steady, continuous process improvement. There are no quick fixes. Patience, persistence, and teamwork are essential ingredients. I am convinced the acquisition process is not working as well as it could be; we are all aware the programs take too long, more often than not, come in late and over budget, and often do not meet their stated objectives. However, I am equally convinced that together we can dramatically improve this situation.

Secretary Cheney's Defense Management Report (DMR) to the President started us down the road of change. It mandated fundamental cultural changes and provided the framework for that change. Much has been written about accomplishments made under the umbrella of the DMR. The changes made and still being made provide for improved teamwork and communications, managers' participation in the policy-making process, innovation, integrity, and accountability.

> *"Each of us is responsible for improving the part of the process for which we have responsibility."*

Improved communication at all levels is the key to our continued success. I meet weekly with the Service Secretaries and the Service Acquisition Executives. In addition, I host weekly breakfasts or lunches with Program Executive Officers (PEOs) Program Managers (PMs), Senior Contracting Officials, USD(A) staff members, Industry Executives, Congressional staff and members of the media. The intent is to provide for a free exchange of ideas and to develop an atmosphere of trust among all members of the acquisition community. Let's build on this. Each of you also can identify those within your immediate sphere of influence and meet regularly with them to improve communications.

But DMR was only a start. We must continue the reform process. After much study of the defense acquisition process, I am convinced that new initiatives should strive to create an acquisition process characterized by program stability, accountability, and trust—one that would be focused on customer satisfaction achieved through continuous process improvement. In the months ahead you will hear much more about these basic tenets that will guide future improvements to the acquisition process. For now, let me just briefly touch on each.

Program stability does not mean the absence of change. Change is inevitable, but it does mean change has to take place through an orderly process. Obtaining program stability is easier said than done. It is a multifaceted problem, but I believe we are making progress. Program stability was the subject of a PM workshop in March 1990 and again discussed at the Acquisition Leadership Conference held at Panama City, Fla., in May 1990. Many initiatives are underway which include: a reduction in OSD funding withholds, disciplining the Defense Acquisition Board process, strengthening the PEO chain of command, defining the proper role of the OSD and Service staffs, and working hard to develop the perception and reality of an efficient team in place and in charge of the acquisition process.

Accountability is a simple concept but one that is difficult to enforce

PROGRAM manager

J o u r n a l   o f   t h e   D e f e n s e

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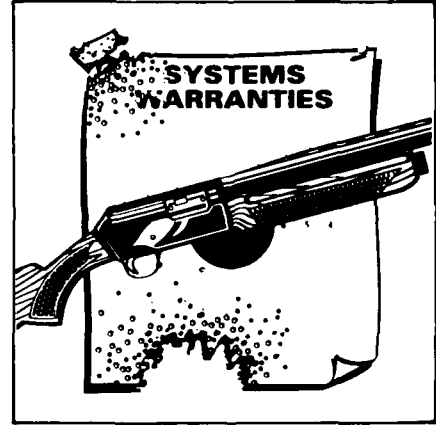
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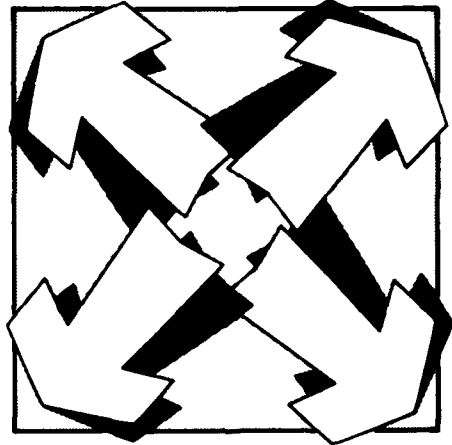
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An Alternative To The Program Executive Office In Chemical Nuclear Matters

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Joseph Cartelli

This mission will benefit the Army Materiel Command, the Army, and the soldier in the field.

CURRENT CONGRESSIONAL CONCERNS AND ACTIONS

David D. Acker

One Senate and three House bills of interest to many readers of this publication are now under consideration by members of the United States Congress. The bills are identified and discussed briefly in the following paragraphs.

S. 2114 Excellence in Mathematics, Science and Engineering Education (EMSEE) Act

On February 8, Senators Ted Kennedy (D-Mass.) and Mark Hatfield (R-Ore.) introduced legislation which has as its goal to make American students first in the world in mathematics, science, and engineering achievement within the next decade.

In remarks before the Senate Education and Labor Committee, Senator Kennedy stated, "In a recent survey of 13 countries, United States high school seniors ranked 9th in advanced physics; 11th in advanced chemistry...." Other statistics quoted by Senator Kennedy were equally grim. Only 5 percent of U.S. undergraduate students earn bachelor of science degrees, compared to 20 percent in Japan and 37 percent in Germany. Of the engineering doctorate degrees awarded yearly in the United States, 50 percent are earned by foreign students.

The Kennedy-Hatfield legislation addresses these concerns by funding programs that will elevate the scientific and technical literacy of the general public. The legislation focuses on improving elementary and secondary education; provides for the education of future scientists and engineers by expanding undergraduate programs and increasing National Science Foundation (NSF) graduate fellowships; and raises the number of women and minorities currently enrolled in mathematics, science, and engineering courses.

Professor Acker is a senior member of the research staff in the Department of Research and Information at the Defense Systems Management College.

EDUCATIONAL EXCELLENCE

APPLYING FEDERAL RESEARCH

COOPERATIVE PRODUCTION

METRIC CONVERSION
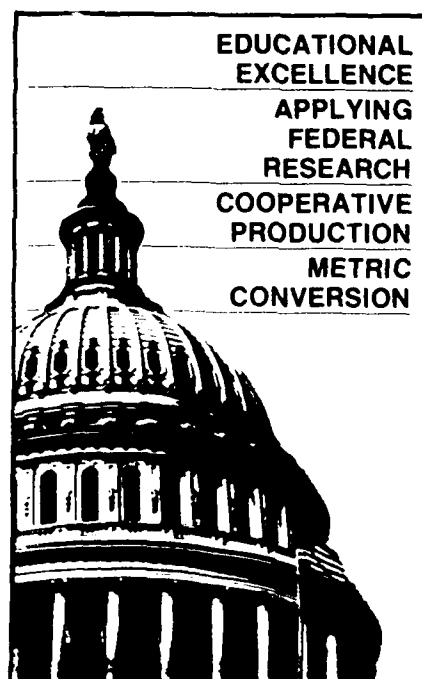
H.R. 4329 American Technology Preeminence Act

The House Science, Space, and Technology Committee has approved landmark technology legislation by approving this bill. The bill, which authorizes funds for agencies within the Department of Commerce Technology Administration, is aimed at enhancing "the position of United States industry through application of the results of federal research and development, and...other purposes."

The bill contains the following provisions:

—It strengthens the Technology Administration (including the National Institute of Standards and Technology).

—It revises the antitrust law to encourage joint production ventures in high technology, and it repeals the treble damages that are imposed on a guilty party.

—It provides an investment tax credit for emerging technologies.

—It creates commissions to study the cost of capital, federal procurement policy, and federal policy on high resolution information systems.

The bill supports emerging technology commercialization by promoting industrial consortiums in such fields as advanced manufacturing, High Definition Television (HDTV), and superconductivity; and, by offering competitive grants for research ventures in technologies critical to a

single industry that no single company can afford to undertake.

H.R. 4611 National Cooperative Production Amendments of 1990

The House Judiciary Committee has approved a bill to amend the antitrust law with regard to joint manufacturing ventures. This bill removes the threat of treble damage lawsuits against manufacturers who notify the government of their desire to undertake a cooperative joint venture. Within a week after the Judiciary Committee action, the Bush administration presented its proposal to encourage joint ventures, the Cooperative Production Act of 1990. The Bush bill is similar to H.R. 4611, except the latter limits foreign participation in order for a joint venture to receive antitrust protection. Last year similar legislation (S. 1006) was introduced in the Senate.

Metrication

With regard to metrication, 1992 will be a big year. In 1992 the U.S. government must comply with provisions of the 1988 Trade Act which requires conversion to the metric system in all federal procurements, grants, and other business related activities.

Europe '92 will change the world marketplace. In announcing a recent House Subcommittee on Science, Research and Technology hearing on metrication, the chairman, Rep. Tim Valentine (D-N.C.), said, "The entire developed world except the U.S. operates on the metric system. Our products are beginning to be rejected by other countries because they do not meet metric standards. Europe '92 will close the European door to the non-metric products of U.S. manufacturers. It is important to examine the status of the conversion to metric and the role of the Federal Government in this change." Rep. Sherwood Boehlert (R-N.Y.), ranking Republican member of the Subcommittee, said, "For at least the past 20 years, students have been told that U.S. conversion to metric is imminent. Yet, we are still waiting...."

The subject of metrication has been covered in several articles in the *Program Manager* in the past. Perhaps some positive action will now be taken by the Congress.

John A. Betti

ACQUISITION IMPROVEMENT UPDATE
(Continued from page 1)

without program stability. Program decisions cannot be allowed to be changed arbitrarily by outside influences. That is why I continue to push hard to establish clear and realistic program objectives and maintain that changes to those objectives be approved by the original approval authority. I am dead serious about holding people accountable. After my first Defense Acquisition Board meeting I moved the PM from the back of the room to the front and from a sometime participant to a presenter. I did this believing the PM to be the only person in a position to commit to the plan being presented.

Trust is based on the confidence that one will act with integrity and fairness. It also includes the confidence that one will do what one has committed to do. Trust is fragile. It is difficult to earn and easy to lose. It cannot be decreed. Trust must be the glue that holds the acquisition community together. The alternative is micromanagement, excessive audits and reviews, and over-specification. In reality, much of what we are trying to eliminate was put in place because of a lack of trust.

Many of the new initiatives underway have, and must continue to, come from you—the acquisition community. A good example of this is the Acquisition Leadership Conference previously mentioned. More than 70 recommendations for improvement resulted. Each is being actively considered for implementation. We also are conducting monthly problem-solving workshops at the Defense Systems Management College—the first on July 17-19, 1990. Twelve industry executives will be tasked with identifying their specific problems with DOD procurement policies and audit procedures and identifying realistic solutions.

I am depending on you to maintain the momentum. Each of us must become involved in improving the process. Each of us is responsible for improving the part of the process for which we have responsibility. Helping to improve that which we influence and suggesting improvements is the rest of the process. Speak up with changes you think we need to make—there may never be a better opportunity to fix the process.

This is the first in a continuing series of articles to keep you, the acquisition community, up-to-date with acquisition improvement initiatives. Together we can make a difference!

"...with liberty and justice for all."

BUDGET INSTABILITY

A Costly Malpractice

Rolf Clark

Budget instability like that seen in defense during the past 20 years is costly and unnecessary: costly because stable funding would have provided significantly more forces; unnecessary because most of the loss can be avoided if planners are told what next year's top line budget will be. With congressional cooperation, that top line information can be provided.

Of course planners must then plan rationally. That means they must fund ownership (operations, maintenance, manpower, and support) before funding new acquisitions. In everyday terms, feed and clothe the family before buying a new car.

The Costs

During the past 20 years the Navy received about $1.5 trillion measured in 1988 terms. Annual budgets grew erratically, declining 5 percent, growing 10 percent, declining 6 percent, etc. That's unstable funding.

If budgets had instead grown at a steady 1.5 percent per year, the same $1.5 trillion would have yielded 15 percent more forces. The Navy would plan on 17 Carrier Battle Groups in the 1990s, instead of 15.

Budget instability has two components. One is the absolute change, from year to year, in the budget level. The other is the uncertainty of those changes. If budgets are erratic, but known, the effects of unstable funding are less severe.

Dr. Clark is a professor in the Research Directorate at the Defense Systems Management College.

If the Navy had known its top line funding a year in advance, the loss in force levels would be about 5 percent instead of 15.

Figure 1 provides perspective. The top line shows force levels if budgets had grown steadily. The second line shows effects of erratic funding, but with planned budgets equaling actual budgets. The bottom line shows what happens when planned budgets are estimated, and then changed to match actual funding.

Analogous results apply to the other Services, though their growth patterns differ. Let's look at the dynamics in general terms.

Acquisition Versus Ownership

When budgets suddenly change, force levels do not—not right away. Weapon systems stay active until they age enough to be inactivated. Forces therefore change slowly, so their demand for "ownership" funds (operating, maintenance, manpower, and support) change slowly too. That implies that unless ownership accounts are under-funded, or inactivations are forced prematurely, budget changes must be absorbed by the acquisition accounts.

For crude perspective, if acquisition is one-half of the total budget,

DOD BUDGET HISTORY
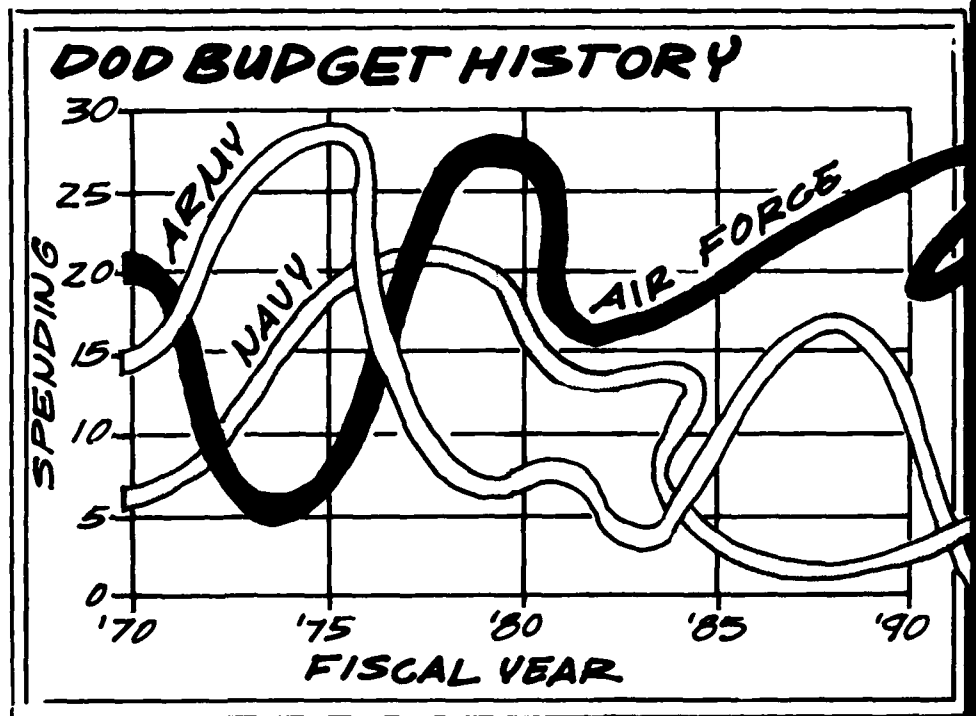
then a 5 percent change in overall funding translates into a 10 percent change in acquisition. If acquisition is a third of the budget, then a 5 percent budget reduction means a 15 percent reduction in acquisition.

Historical data confirm that acquisition budgets are the "swing" accounts. Figure 2 compares fractional changes in actual defense budgets with changes to procurement accounts. When budgets change, the proportional change to procurement is two or three times greater.

These dramatic budget changes affect unit costs and quantities produced.

Cost/Quantity Dynamics

There is a necessary relationship between unit costs and quantities procured, and the budget changes made. This relationship is complex, but can be derived from logic and confirmed by historical data.

Data show there is a different relationship between these factors for *assumed* budget changes, as when plans are made, and for *unexpected* budget changes, as when plans are revised. This is a key difference.

Suppose a Service plans on a 5 percent budget increase, and a year later

FIGURE 1. FORCE LEVELS AND BUDGET STABILITY

RELATIVE FORCE LEVELS

– – – – – STEADY GROWTH ━━━━━━ PLAN ≠ ACTUAL
•••••••••• PLAN = ACTUAL

TIME
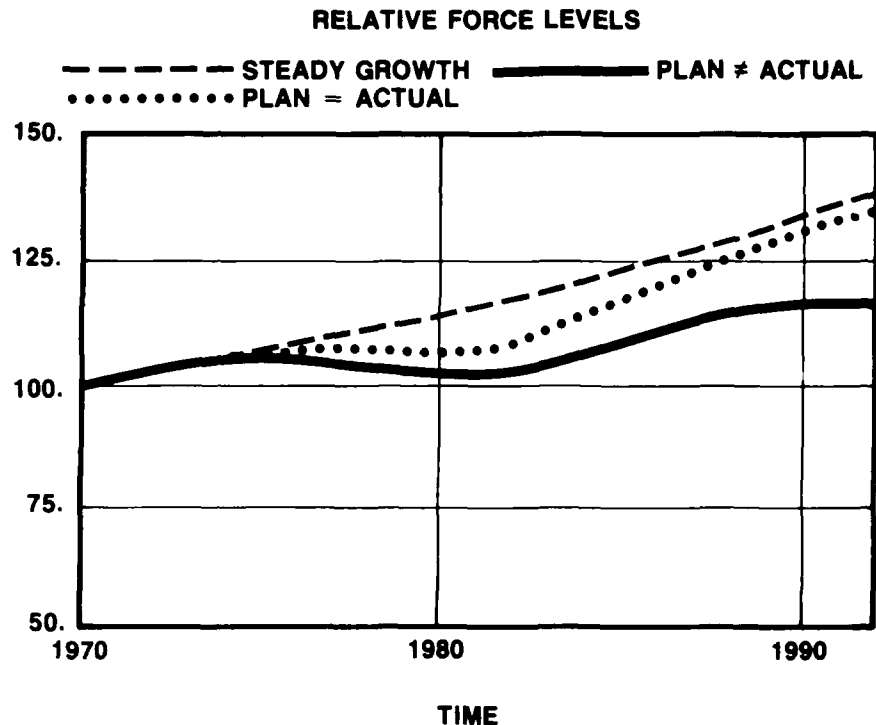
that planned increase is negated. There is a net zero percent change to the budget, but unit costs will, nonetheless, rise about 10 percent. There would be no increase in unit costs if the zero percent change had been planned.

The difference is embedded in the "elasticity" of unit cost with respect to quantities; how much unit costs change, proportionately, when quantities change. Historical data from 1976 through 1987 show this elasticity is about twice as large when changes are *unplanned* than when changes are planned.[1]
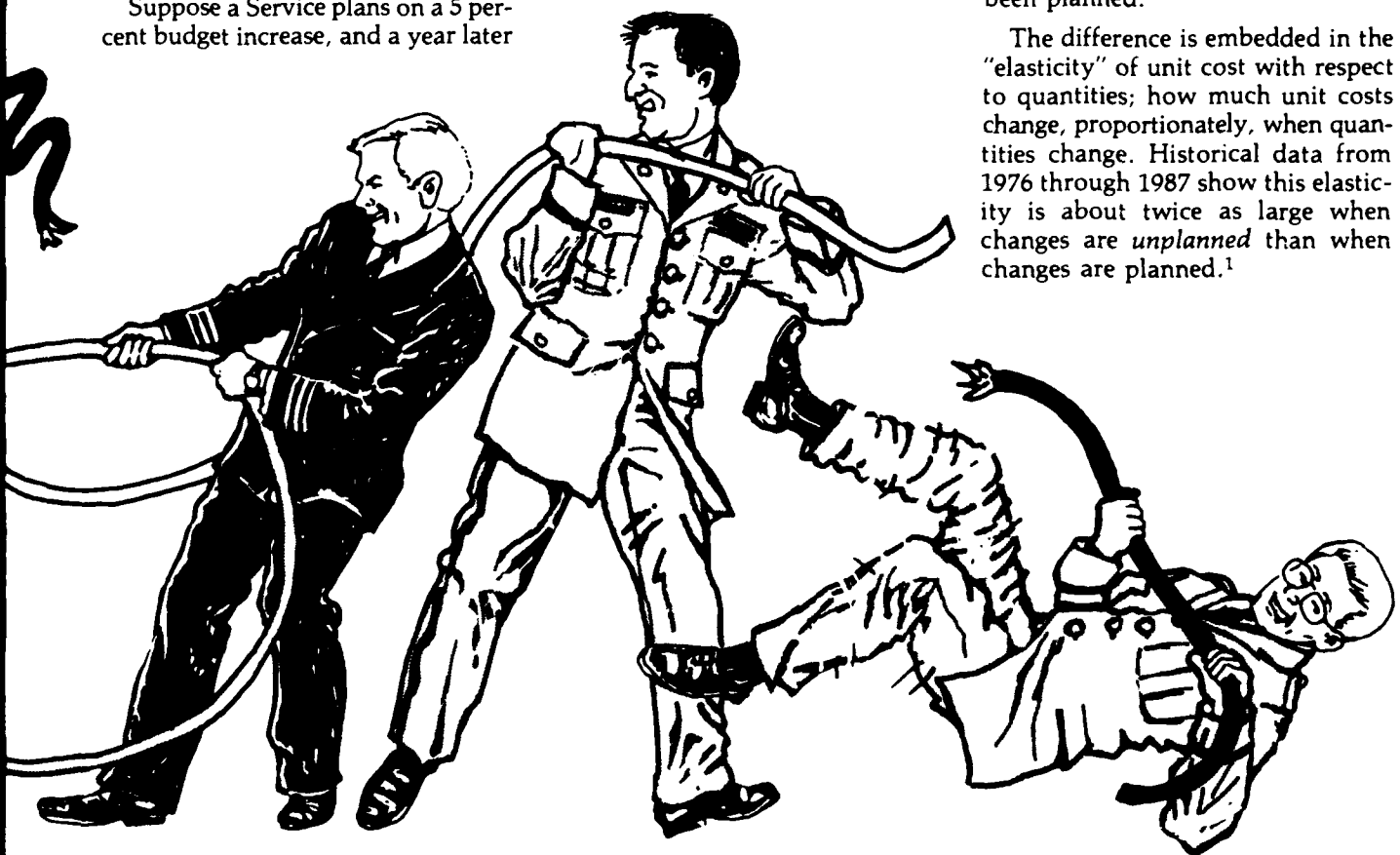
FIGURE 2. PROCUREMENT SENSITIVITY

DOD: TOTAL VS. PROCUREMENT BUDGETS

ANNUAL CHANGES FROM PRIOR YEAR

☐ TOTAL BUDGET ◆ PROCUREMENT

One likely logic behind these differing elasticities is that changes to plan occur later in the planning cycle, causing inefficient adjustments to production plans. Changing the architect's drawings late in the process is costly even if construction of the house hasn't begun. Perhaps the builder has reason to bid low if he knows the buyer needs the house soon. Whatever their cause, the two elasticies result from the actual historical data.

This means changing plans is costly. More is spent buying less. Furthermore, over time, the annual unit cost inefficiencie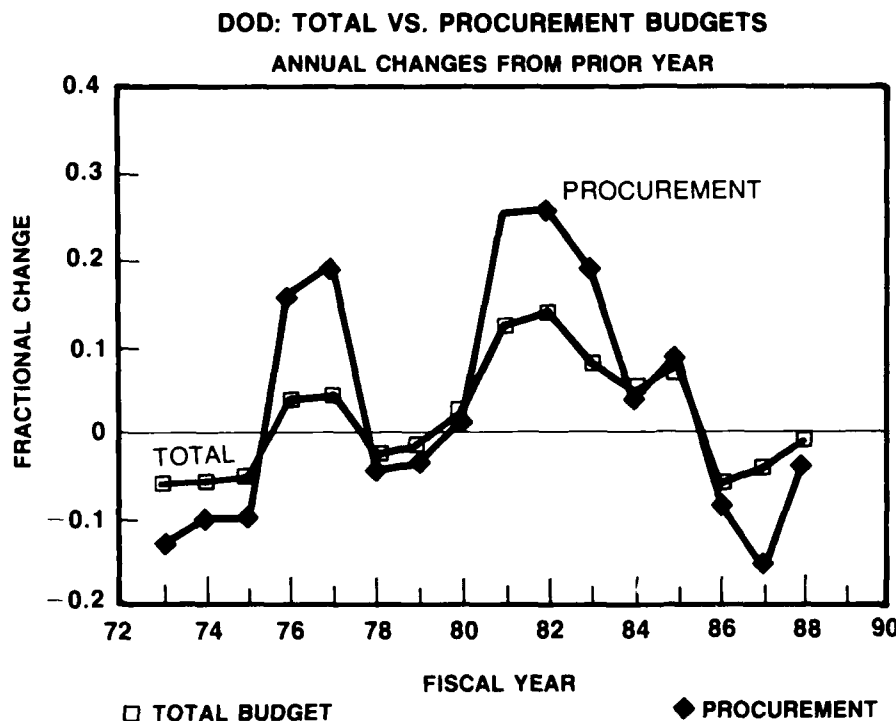s become embedded in the cost-estimating relationships used to derive future costs. Estimates for future systems become inflated. Figure 3 shows typical unit cost trends under steady growth (bottom line), erratic growth with planned budgets equaling actuals (middle line), and erratic growth with planned budgets not equaling actuals (top line). The growth in unit costs under uncertain, erratic budgets is about 4 percent per year greater than under stable funding. Note that more than two-thirds of the relative unit cost rise is due to uncertainty, that is planned funding not equaling actual funding.

Interservice Dynamics

Consider the graphs (Figure 4) showing force levels relative to their initial levels for the Army, Navy and Air Force. Each graph compares force levels that would occur under stable

funding and unstable funding. Total funds obligated by each Service approximately equal those actually obligated during the past 20 years.

Curves are not meant to provide absolute values for force levels, but to yield insight into the affects of instability. Absolute values are affected by things like individual valuation of specific units, and inclusion or exclusion of system categories like ballistic missiles. Nonetheless, relative levels of the three Services shown are fairly consistent with results of a congressional report that found Army assets growing about twice as fast as the Navy's and the Navy's about twice as fast as the Air Force—during the 1970s and 1980s.[2]

The Air Force assets shown in Figure 4 are relatively suppressed, over time, because the model includes missiles in a "support" category, instead of as "force levels." Much of the 1980 Air Force growth occurred in the missile procurement account.

Furthermore, the average growth in real spending for the Air Force was lower than the other Services. Total Navy obligations during the 1970-90 period equate to a +1.5 real percent growth per year, the Army to +.15 percent, and the Air Force to no growth.

FIGURE 3. UNIT COSTS AND BUDGET STABILITY

UNIT COSTS RELATIVE TO INITIAL VALUES

— — — — STEADY GROWTH ▬▬▬▬▬PLAN ≠ ACTUAL
• • • • • • • PLAN = ACTUAL

TIME
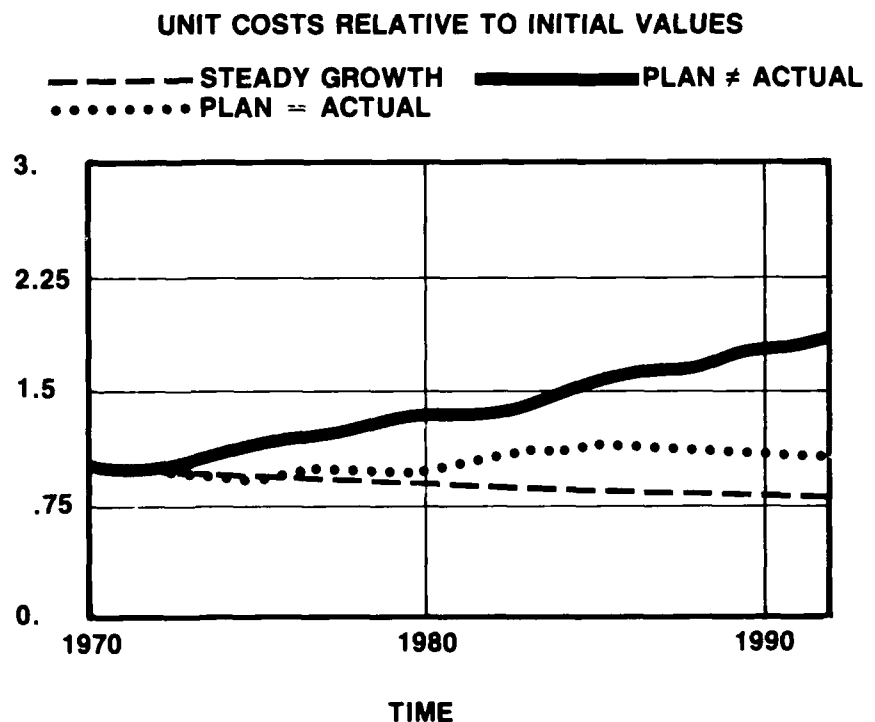
There are two main observations from Figure 4. Army dynamics, the variance between steady and erratic growth, are more extreme than the Air Force, and the Navy is the most stable of all. Budget changes to the Army cause fairly extreme changes to force levels in the near-term. Thus, Army assets suffered dramatically in the '70s and again in the late '80s, when budgets were scarce.

The second observation is that while the Army is affected quickly, it recovers rapidly after periods of budget growth, as in the early '80s. The Navy, on the other hand, slowly loses force assets during the entire time span. The effect on the Air Force is somewhere in-between.

More specifically, the Navy consistently loses relative forces during the 20 years of instability, so that its worst case occurs at year 20. The Army has 40 percent less forces at the midpoint, then starts gaining relatively, so that after 20 years it has only 10 percent fewer forces than under stable funding. The Air Force has more than 20 percent fewer forces at about year 16, then ends up with about a 14 percent difference by the 20th year.

These differing dynamics depend mainly on two things: the relative magnitude of acquisition budgets as fractions on the total budget, and the life span of the systems acquired.

Recall that acquisitions are forced to absorb most changes to a budget. Army acquisitions, a relatively small part of the Army total, are therefore hit hardest by budget changes. Army procurements, about 20 percent of its overall budget, cannot absorb a 5 percent cut in the overall budget as easily as Navy procurements, which are about 40 percent of its budget.

Yet, the Army recovers faster because its systems have shorter life spans than the Navy's 30-year ships. Army systems inactivate more rapidly in the years after budget cuts, leaving less systems to be supported thereafter. That, in turn, means more funds from subsequent budgets can be used to rebuild forces. Meanwhile, the Navy is stuck with ships for two or three decades.

Thei e is another implication. During periods of extreme budget reduc-

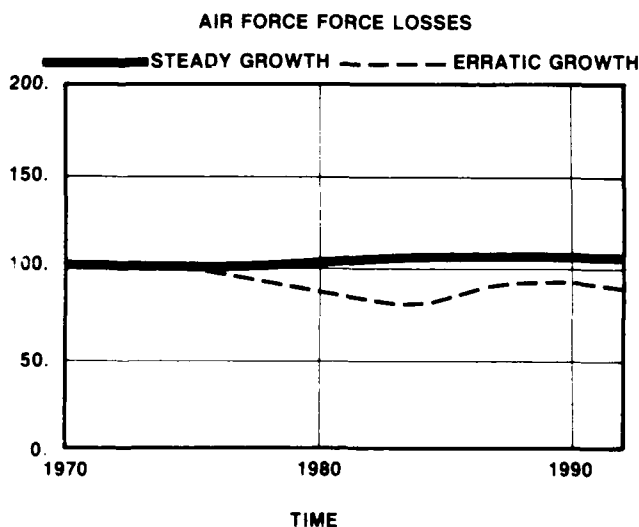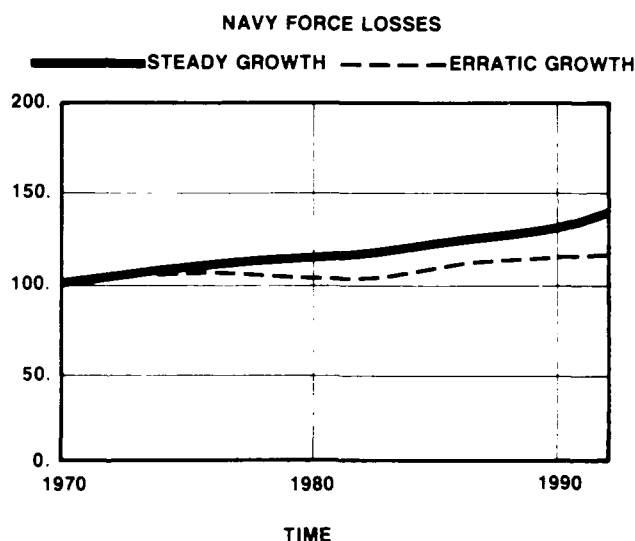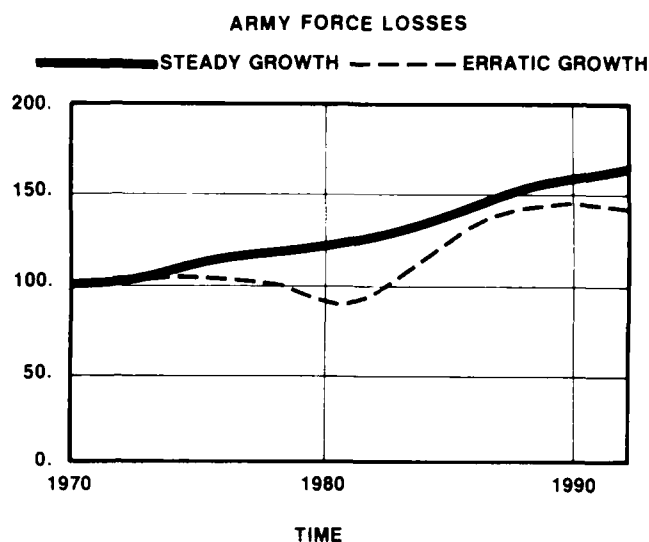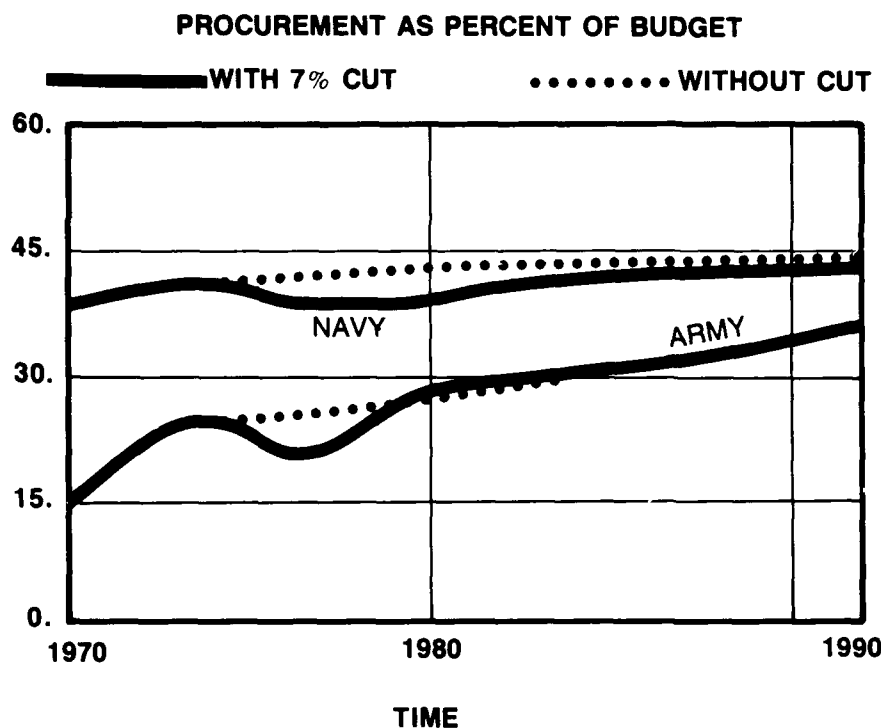## FIGURE 4. DYNAMIC DIFFERENCES BETWEEN SERVICES

ARMY FORCE LOSSES

STEADY GROWTH — — — — ERRATIC GROWTH

NAVY FORCE LOSSES

STEADY GROWTH — — — —ERRATIC GROWTH

AIR FORCE FORCE LOSSES

STEADY GROWTH — — — — ERRATIC GROWTH

FIGURE 5. PROCUREMENT DYNAMICS

PROCUREMENT AS PERCENT OF BUDGET

━━━━━WITH 7% CUT   • • • • • • • WITHOUT CUT

TIME

tions, the Army is more likely to be forced to reduce the readiness of existing forces. This is because support funds, operations and maintenance funds, and manpower must absorb some budget reductions; procurement budgets are not large enough to do so themselves. The Army industrial base would be too severely affected by the amplified swings if a large cut was absorbed totally by procurement. In some years, no procurement funds might remain were ownership accounts not reduced.

One way to see differing effects of budget changes on the Services is by imposing an arbitrary cut to each Service's top line budget and observing results. In Figure 5, the vertical axis represents the fraction of the budget going to procurement. Dotted curves are the fraction if budgets grow steadily. Solid curves show the effect of a 7 percent decrease in the fifth year of the simulation.

The maximum difference in the Navy curves is about 8 percent. For the Army, the difference is about 19 percent.

Because Army systems can be inactivated faster, after 1980 less funds are required for ownership accounts, so the procurement budget returns to

and for a while even exceeds its steady growth level. There are less forces to support and, therefore, more money left for procurement.

The Navy, meanwhile, must continue to operate and maintain its aging fleet, so procurements do not approach normal levels until about 25 years have passed.

Policy Implications

Planners can incorporate knowledge of these basic dynamics in long-term considerations of readiness and force levels. Proper budget policy can aid the resource-allocation process. Acquisition budgets, specifically, can be realistic. Such strategic budget planning is particularly needed during periods of large budget reductions, as may be the case in the 1990s.

Efficiency can be increased considerably if planners can be reasonably sure of the budget next year. That does not mean every program manager needs to know the funding level for the next year. That would be unrealistic. Efficiency is gained merely by each Service knowing the next-year *overall* constant dollar budget.[3] Then, proper guidance on procurement levels can follow.

Nor is it expected that budgets grow at a steady rate. The knowledge of what the budget *will* be can recapture about two-thirds of losses caused by the uncertainty portions of instability.

Reasonable certainty about the next-year budget level can be attained through congressional action. In a one-year budget cycle, the Congress would need to specify the next-year budget before planners begin allocation decisions. In one version of a 2-year budget cycle, the second year of one 2-year plan becomes the first year of the next 2-year plan. Efficiencies fall out almost naturally from such a budget cycle.

With a realistic top line budget, planners can derive what will remain for procurement of new systems, as the ownership funds demanded by existing forces next year is quite predictable. The cost of operating, maintaining, and manning them is estimable. Support costs, while less directly related to force levels, can still be estimated in a macroscopic sense.

Individual system acquisitions would, of course, still vie for available resources. Political and other facts would still cause reallocations of available acquisition funds. But, reallocations would occur within a reasonable limit. Some programs would gain, others lose from planned levels. Overall, the adjustments from the plan would net out to about zero. That is not the case if the entire procurement total is to be decreased or increased by 10-20 percent.

This is a crucial point. When all programs are cut (or expanded), resources cannot be shifted easily. When some gain and others lose, on the other hand, the gainers can absorb the resources given up by the losers. Those expanding can, as one example, hire the engineers let go by the losers. Not so when everyone is hiring, or firing.

Budget stability in the acquisition area can be improved, and its significant efficiencies realized.

The Model

A brief look at the simulation model producing these results is appropriate.

The model is preliminary. It captures the major dynamics of resource allocation to provide insight into what can be gained from stability. Most of the first order dynamics are captured in the current model. Nonetheless, a more detailed model would be appropriate if defense policymakers wish to assimilate this specific form of dynamic analysis into actual defense planning.

The current model is a microcomputer based simulation written in a commercial software language called Professional DYNAMO+.[4]

The model has about 300 lines of code, consistent with a "policy level" analysis. Policy level means that the large scale, macroeconomic effects of different allocation policies can be explored. It allows "what-if's." What if fiscal constraints apply? What if readiness is deliberately underfunded? What if inactivations are forced? What if budgets are cut 5 percent a year for several years? What if less manpower intensive forces systems are acquired?

These "what-if's" are conducted without bogging down in the details of specific program allocations—thus the term "policy level".

Several important relationships are embedded in the model. They can be changed for specific uses. The current model assumes that fiscal constraints apply, that ownership accounts are funded first, but are under-funded if procurement residuals are less than a reasonable fraction of that needed to replace inactivating assets. Unit costs are assumed to be impacted by what has been paid for units recently, but only after a lag of several years.

Funding reallocations during times of severe budget reductions are based, roughly, on historical information. Manpower budgets cannot be under-funded by more than 5 percent in a single year, as personnel cannot be forced out any faster than that. Operations/maintenance is limited to a 10 percent under-funding per year, and support to 50 percent.

Readiness of available forces is affected when these ownership accounts are under-funded. Backlogs of maintenance and support not funded accumulate, and these accumulations reduce force availability. The reduc-tion relationships used are considered reasonable, though have not and perhaps cannot be verified with real data. In the results provided above, no backlogs were accumulated at the end of the 20-year periods defined, so readiness shortfalls did not skew the data presented.

During times of extraordinary budget growth, such as experienced by all Services in the early 1980s, the industrial base is assumed to be limited in its growth rate. Expert opinion on industrial base growth lead to limiting the increase in the overall industrial base to 5 percent, if recent growth had averaged more than 10 percent per year.[5] In other words, while individual firms can grow without bound, the defense industry as a whole cannot grow by more than about 30 percent during a short period, without being limited to 5-percent growth the following year. Excess funding during those periods leads to rising unit costs, and inefficiency.

Endnotes

1. The relationship between unit cost c and quantity q is assumed, in the model, to take the classic form

$c = kq**b$: where $**$ means "raised to the power."

This form is then assumed to hold for both planned changes and unplanned changes to budgets, and historical data used to estimate the parameters k and b for the two cases. The equation fits the data well for planned changes, and also reflects the *overall* data pattern for unplanned changes. In the latter case, however, there are inconsistencies between the equation and the data in the range of small reductions in quantity, say between zero and 10 percent. There, it seems many programs accept reduced funding without reducing quantities, implying reduced unit costs for that year. This artificial reduction becomes reflected in future cost increases however. Insight into these dynamics has been provided by James Abellera of the Defense Systems Management College who is exploring these relationships in detail.

Using the approximation $c = kq**b$ is nonetheless felt by the author to capture the general effects of budget changes and instability on system ac-quisition, and to provide correct perspective on the problem. The elasticity b for planned changes is estimated to be −.27, and for unplanned changes −.51.

Specific equations used in the model to relate budgets, quantities, and unit costs were

$Q = (P/K)**(1/(1+b))$ and
$C = KQ**(b)$; where

P is the ratio of the new procurement to original procurement, Q is the average ratio of new quantity to original quantity, C is the average ratio of new unit cost to original unit cost, K is the initializing constant and b is the elasticity, a negative number. K was near 1.0 for both planned and unplanned changes.

For example, with $K = 1$, if planned budgets equal actual budgets, then $P = 1$ and average unit costs would equal today's levels—a zero percent change. If procurement is assumed to grow 15 percent because of a 5 percent increase in the top line budget, then $P = 1.15$ and planned average quantities will increase by 21 percent and average unit costs fall by 5 percent because of the −.27 elasticity factor. But actual procurement loses the 15 percent assumed increase, average quantities fall by 25 percent, and average unit costs rise from plan by 16 percent because of the −.51 elasticity factor. Instead of the zero percent change to unit costs, they rise a net 10 percent *for this one year*. Unit costs in general then rise, after a lag, if such inefficiencies persist over time.

2. See Lane Pierrot's *Operation and Support Costs for the Department of Defense*," Congressional Budget Office, July 1988.

3. James Abellera's work is relevant. See "Spending Instability and Acquisition Costs," *Proceedings of the 1989 Acquisition Research Symposium*, pp. 105-111, Defense Systems Management College, Fort Belvoir, Virginia.

4. Available from Pugh-Roberts Associates, Five Lee Street, Cambridge, Massachusetts, 02139.

5. Dr. Franz Frisch, Defense Systems Management College, provided expert opinion on industrial base issues.

INFORMATION SYSTEMS ACQUISITION

AFLC's Logistics Modernization Program Has Some Excellent Ideas to Bat Around

Charles N. Moser

The Department of Defense has undertaken many Automatic Data Processing (ADP) development programs during the last several years. In almost all cases, the programs have experienced significant schedule slips and cost increases. The General Accounting Office (GAO) repeatedly has cited major problems in information systems development programs. As a result, the House Appropriations Committee assessed significant reductions in ADP funding to Department of Defense programs.

In the midst of this activity, An Air Force Logistics Command effort has been recognized by the House Appropriations Committee and the Office of the Secretary of Defense as having been particularly successful. This is the Logistics Management Systems (LMS) Modernization Program. In this article, I will describe the LMS program, discuss several problem areas that aggravate the problem of cost control, and present the approach used by Air Force Logistics Command to identify and control cost increases.

Logistics Management Systems (LMS) Modernization Program

This program is a major effort by the Air Force Logistics Command (AFLC) to upgrade its aging and obsolete computer systems. The LMS program will modernize all the major A.F. automated systems in use today that perform the four core functions of logistics: requirements determination, acquisition, distribution and maintenance. Current systems are batch oriented, sequential processing systems, not timely, and have no surge capability. The new LMS will be a real-time, terminal-to-host arrangement.

This major task has been subdivided into nine major programs.

—Contracting Data Management System

—Depot Maintenance Management Information System

—Engineering Drawing Computer Assisted Retrieval System

—Enhanced Transportation Automated Data System

—Intersite Gateway

—Local Area Network

—Requirements Data Bank

—Stock Control and Distribution

—Weapon System Management Information System

In addition, five other major programs have been added to the overall modernization effort.

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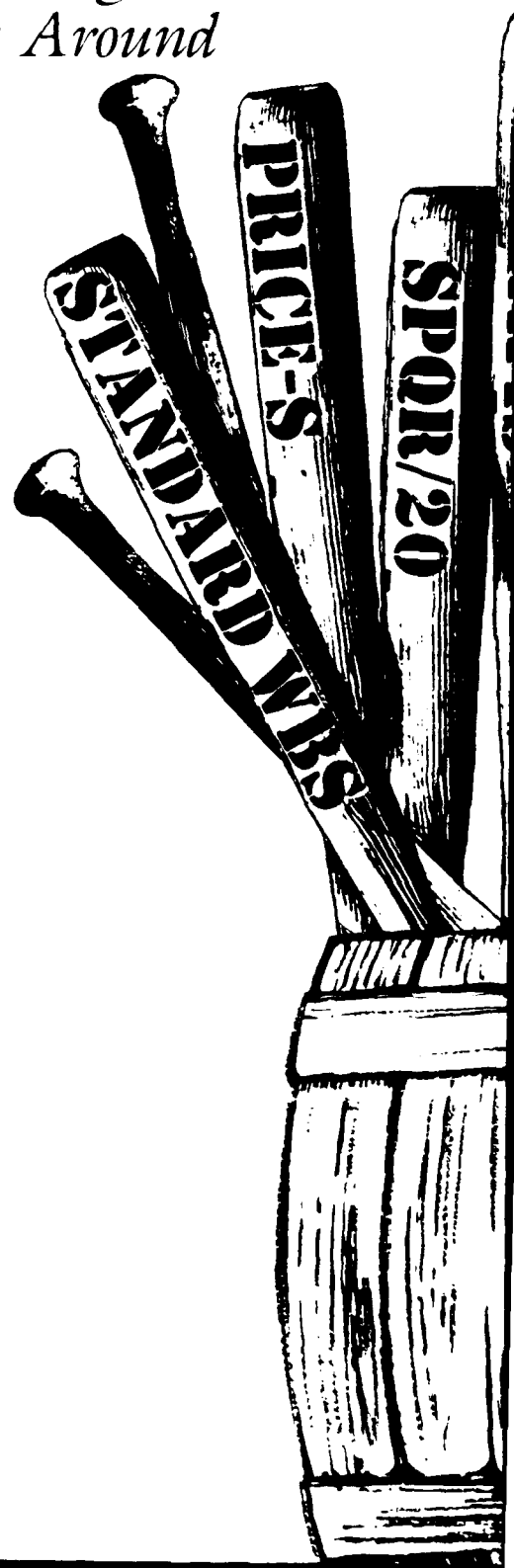
—Air Force Equipment Management System

—Air Force Technical Order Management System

—Automated Technical Order System

—Central Procurement Accounting System

—Reliability and Maintainability Information System

The LMS modernization program will procure Automatic Data Processing Equipment (ADPE) and software development from contract sources. No organic, in-house development will be accomplished. Success of the LMS program is vital to AFLC and the future of Air Force logistics. All acquisition is being accomplished by the Logistics Management Systems Center (LMSC).

Problems Affecting Cost Growth

The following sections will concern problems affecting cost growth, and the AFLC approach to control costs of information systems acquisition programs.

In the area of information systems acquisition, there are several environmental items contributing to the problem of cost growth, which are typical of this type of acquisition.

Inadequate Cost Estimates

Early estimates of program cost are often done by functional (vs. cost) personnel. In AFLC, budget requirements input each year is accomplished by requesting all organizations to submit a Communications-Computer Systems Requirements Document (CSRD). These CSRDs are submitted by functional organizations, which must estimate hardware, software, manpower and cost of the program. Other than a cursory review during the CSRD coordination cycle, no in-depth independent cost estimates are performed at this time. This functional activity's "best guess" was the dollar figure used in the AFLC budget. These early estimates were usually insufficient, but became the initial cost estimate for the program, and the starting point for all cost tracking. Even though better cost estimates are available at Milestone I and contract award, these initial estimates were the basis of com-

parison for all future estimates, leading to inaccurate reports of cost growth.

Difficulty in Stating Requirements

User (functional) organizations are responsible for determining requirements of the new system so that proper documents can be prepared to proceed with an acquisition program. In almost all cases, user requirements were not specific enough and often subject to frequent change, even after contract award. The user organization must approve and accept the developed system, or it will not be used effectively. Although most user-requested changes are relatively small, there are usually a large number of them, which can contribute significantly to program cost growth and schedule delays.

Lack of Program Management Expertise

The last issue concerns lack of program management expertise in most ADP contractors, even large well-known companies. In data systems acquisition, usual developers are independent "software development houses" or data systems divisions of larger corporations. Both are stocked with well-qualified, technically competent programmers and engineers. They lack skills of good upfront planning, resource allocation and, especially, control techniques. Almost none have done a Cost Schedule Status Report. Few have been able to load appropriate data into the Program Milestone Network and keep it updated. This results in continual revision of program management information, and clouding of problems until it's too late. Usual remedies are schedule slips and cost increases. In the next section, I discuss the approach used by AFLC to identify and control cost growth. Eight items have been used successfully in the effort to control cost.

Controlling Acquisition Cost Growth

1. *Use of a Standard WBS.* In order to adequately assess any contractor cost proposal for realism, reasonableness and completeness, costs must be presented in accordance with a standard work breakdown structure (WBS). As of this time, no

Office of the Secretary of Defense standard WBS exists for information systems (re: MIL-STD-881A). Therefore, a standard WBS was created in the LMSC to use in evaluating contractor proposals and for performance measurement purposes. It consists of the following accounts (level 2): management, system engineering, ADPE hardware, commercial off-the-shelf software, application software, communications, facilities, systems integration test and evaluation, data, training, implementation, operations and maintenance. This particular structure has served well and remains relatively unchanged today. In March 1989, the Air Force Cost Center issued guidance (AFCSTCP-1) containing a standard WBS and dictionary for use in preparing program office estimates of life-cycle cost.

2. *Use of Cost Models.* Program cost estimates have been enhanced by the use of currently accepted and widely used cost models. Four such models now in use by the LMSC to estimate software development costs are: the (Boehm) COCOMO, the (GE) PRICE-S, the (QSM) SLIM and the SPQR-20 model.

Cost models are used by the LMS community for several purposes. For the pre-source selection period, cost models are utilized to estimate the software costs for the economic analysis (EA) and the independent cost estimate (ICE). Normally, two cost models are used by the cost analyst to estimate the software costs and schedules, with one model as the primary estimator and another acting as the backup estimate, hopefully confirming the other estimate. After source selection, cost models are used to estimate software costs for program office estimates (POEs), cost-to-complete, sufficiency reviews, latest revised estimate (LREL), and periodic schedule assessments.

COCOMO

The Constructive Cost Model (COCOMO) is probably the most comprehensive formal, and exhaustive of the software estimating models. The primary cost driver for the model is thousands of delivered source instructions (KDSI). Three dif-

The Constructive Cost Model (COCOMO) is probably the most comprehensive formal and exhaustive of the software estimating models.

ferent and progressively more detailed models are included in COCOMO: basic, intermediate, and detailed. The LMSC typically has used the intermediate, semidetached version of COCOMO. The intermediate COCOMO model estimates software development costs such as: plans and functional design, product design, programming, and integration and testing by generating a nominal effort with the output tailored to a specific project. Another important feature of the COCOMO is that it will estimate software maintenance costs.

SLIM

One model extensively used by LMSC is the Software Life-Cycle Investment Model (SLIM). The SLIM uses three inputs: lines of code, productivity index (PI), and manpower buildup index (MBI). There are two methods of determining the PI and MBI by using SLIM. The best is calibration by using actual historical data. When no actual projects for the developer are available, a questionnaire approach is taken, and SLIM provides a typical PI and MBI based on information provided from the questionnaire. Then, SLIM performs a simulation based on parameters of lines of code, PI, and MBI. The final product produced by SLIM are costs for application software from system requirements review (SRR) through system verification review (SVR) including functional design, logicial design, coding, integration, preliminary verification, final verification, and quality testing. The LMSC/SZFA has developed a LOTUS 1-2-3 approximation of SLIM called TRIMSOFT, which is distributed free to interested parties.

SPQR/20

Another model the LMSC uses occasionally is the SPQR 20. This is a cost and quality estimation model for planning software development and maintenance activities. The SPQR/20 is different from other software cost models in that it does not start with lines of code but utilizes the Albrecht Function Point Technique. The model estimates software size, schedule by phase, effort to costs by activity, and quantity of documentation that must be created. The SPQR/20 is applicable for estimates on a large-scale basis and a personal basis. The model predicts the direct labor applied to software development and maintenance. The model will estimate planning, requirements, design, coding, integration, testing, documentation, management, central maintenance, and enhancement activities.

3. *Use of a Management Reserve Estimate.* In the acquisition environment, any prudent program manager will estimate, in the total cost of a program, some amount for management reserve, which is a separate amount of money set aside

for use to cover risk. In the past, initial estimates entered into the POM for ADP programs did not contain any estimate for management reserve. Management reserve should be viewed as a method of providing more realistic estimates regarding the actual cost of a program. The LMSC developed a procedure, based on the Aeronautical Systems Division ECO Model, that has become the LMSC policy on calculating management reserve for the modernization programs. All LMS programs start with a base contingency factor of 10 percent applied against all O&M acquisition cost categories that could be impacted by changes. For LMSC programs, the category most likely to be impacted is software development. This factor should then be adjusted up or down based on a sound, fully documented risk analysis. The following items are assessed in determining the amount to add or subtract from the base percentage (10 percent) (range from 1 percent to +3 percent):

—Design Configuration Certainty
—Technical Advancement
—Contractor Proficiency
—Schedule Compression
—Other Factors—subjective.

4. *Use of Competition and Fixed-Price Contracts.* The AFLC encourages and supports competition in acquisition programs and the award of contracts to qualified small business and minority-owned small business (8A set-asides). Using competition in the LMS programs has resulted in awards to large and small business concerns. Most contracts for LMSC programs are a fixed-price type or are being converted to fixed price. These two items have helped the LMSC to award contracts at a reasonable price, and with a reasonable expectation that final cost and schedule are achievable.

5. *Use of Program Baselines.* In order to track and control program cost growth, the baseline concept used in weapon system acquisitions was applied. In November 1984, each data system life-cycle cost was estimated and the acquisition cost portion reported to the Major Automated Information System Review Council (MAISRC). Subsequent reports track the program acquisition cost against this baseline. All changes
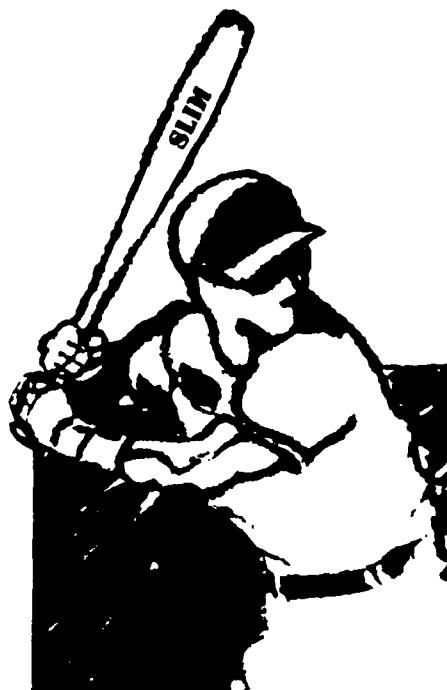
One model extensively used by LMSC is the Software Life-Cycle Investment Model (SLIM).

are recorded on baseline change requests and must be approved by the LMSC commander. Program baselines and status are published quarterly and briefed every 6 months to the MAISRC.

6. *Use of Cost Schedule Status Report (C SSR).* Initially, LMS programs started with cost-type contracts for development efforts and met the criteria for cost reporting. Thus, the LMSC commander issued a policy directive and the standard reports were required, cost schedule status report (CSSR) being the major one. These requirements were in-

cluded in the request for proposal (RFP) and the winning contractor was evaluated on ability to do the report after contract award. Eventually, the LMSC transitioned to awarding only fixed-price-type contracts, and existing cost-plus contracts were converted to fixed price. However, the requirement for a CSSR remained. It is the LMSC position that the CSSR still provides a critical insight to schedule progress and information on cost trends. Due to the nature of information systems acquisition, and the propensity for many changes, it is easy to lose protection of a fixed-price contract; therefore, the need for a CSSR.

Analysis of the CSSR is facilitated using suport tools contained in our program management support system (PMSS). This system utilizes an ARTEMIS software package and aids in identification of report data anomalies and segregating WBS accounts that exceed established thresholds (variance). Each month, variance analysis and projected cost at completion are summarized for each program, and to the LMSC commander. Follow-up meetings are held with the development contractor to address problem areas.

The CSSR analysis results are compared to the program milestone network (contained in the PMSS) and to program management review status provided by the contractor for consistency.

Using the C SSR, we were able to predict major cost increases schedule slips on two programs in time to take positive management action. Another program actually achieved an underrun against its fixed-price contract, as predicted by CSSR analysis; on a smaller program, we were able to forecast serious cost difficulties, which were eventually followed by a contract termination.

7. *Use of Financial Program Management Reviews.* Quarterly LMSC program reviews are presented to the LMSC commander to assess program status and financial health for program requirements to be accomplished in that year. Topics of financial and programmatic na-
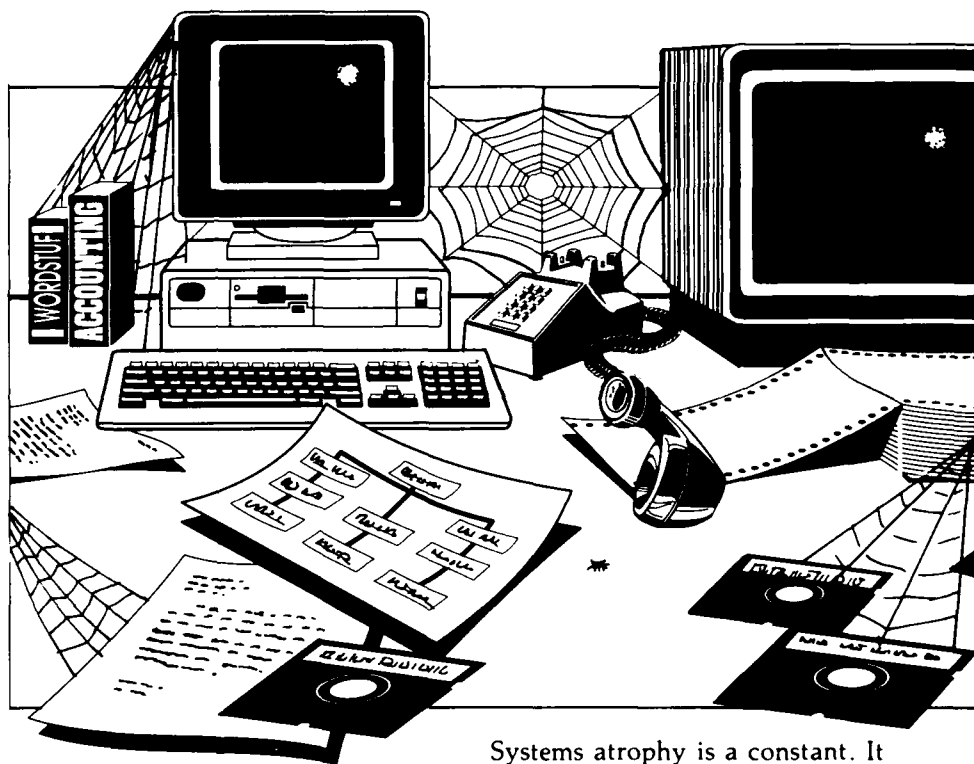
SYSTEMS ATROPHY

Environment and Objectives

Barry Wilmeth

Information systems are designed through a very scientific analysis to produce very specific results or allow for very precise capabilities; however, that unforgiving variable of *change* causes all systems to deteriorate and lose the efficiency of throughput for which they were designed. The result can be a key loss in productive man-hours, limited personal service to the customer, or other direct work-related activities. The descriptive term for systems deterioration is *atrophy*. It occurs when specific agency objectives are no longer being produced. Without a strategy to understand and cope with systems atrophy, key agency tasks may not be accomplished as planned.

Atrophy need not be taken as a *negative* finding. In many cases, it is merely the reflection of a lack of improvement or redesign toward optimization. Every "Drucker-ized" manager in America is concerned with effectiveness and optimization toward maximum productivity. Every theory—X, Y and Z—agrees fundamentally that redesign for the purpose of efficiency is fundamental to sound management practice and that one true information systems axion is that all support systems will eventually deteriorate. It only follows that systems deterioration be formally monitored and reported on.

From Sun Tzu to James Martin, it has been accurately predicted that the transformation of information to knowledge and power is a significant factor which no organizational strategy can succeed without. The technology of processing information is the technology that purports direction to all other technologies and determines the relative effectiveness of achieving agency-related goals and objectives. In a sense, the goal-driven behavior of the agency's information center must be focused on maintaining information systems that are technologically consistent with the organization's service policies and goals.

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Systems atrophy is a constant. It occurs every day, in every system, in every organization. There is no fully optimized information support system. There are no fully accepted international standards for all information systems hardware and software. All information systems deteriorate either organizationally or industrially because every organization, and industry itself, are victims of change every day.

Measuring systems deterioration must also be a constant. Analysts must continuously measure the impact, and advantages of reengineering information systems to meet organizational goals using an orderly and scientific approach. A *miscon-*

ception is buying more modern hardware. The *implication* is that you need better software. The *realization*, however, is that you can upgrade total capability but fail to increase productivity or total throughput. An approach to understanding systems atrophy and developing a master architecture planning document is fundamental to cure.

Two Types Of Systems Atrophy

Atrophy occurs in two major forms—organizational and industrial. *Organizational systems atrophy* occurs when the system no longer meets goals of the organization. When its objectives for research, accounting, briefing preparation, etc., are no longer being met, the system

has begun to deteriorate to substandard performance relevant to the environment in which it is being used. There are many tangible and intangible items in the environment that can be investigated, measured, and discussed. The key ingredient for determining organizational systems atrophy is its effective accomplishments in support of the organization's goals. And those goals are reached by careful deliberation of information systems objectives to support or enhance *performance* of the organization to meet those goals.

Industrial systems atrophy is the process of becoming outdated or less useful because of the systems inability to be modernized or enhanced due to changing technologies. It can begin when the system has fallen off the course of complying with standards. Yes, standards are important. They are important for reasons of flexibility, simplicity in minor upgrades, training, and interfacing with other hardware suites and data base systems. For example, newer fourth-generation languages will not run well on older data-base machines Their kernels are not portable across older hardware suites or are otherwise restricted because of *closed* operating systems. Due to the volume of some data bases, upgrading the machines is too expensive because an entirely new hardware system and modified facility will probably be required to replace the current one.

Measuring deterioration of an information system is the precursor phase for determining if and when an upgrade is necessary. The major consideration in determining the requirement for systems upgrade is not simply to complete the ABCs of problem definition, analysis of alternatives, and development of an acquisition strategy based on the best alternative. The first study must be to consider total capacity and use in the current environment and expectations of the system to work toward organizations goals.

In determining the degree of systems deterioration, you must ask the following questions relevant to the current environment and organizational needs.
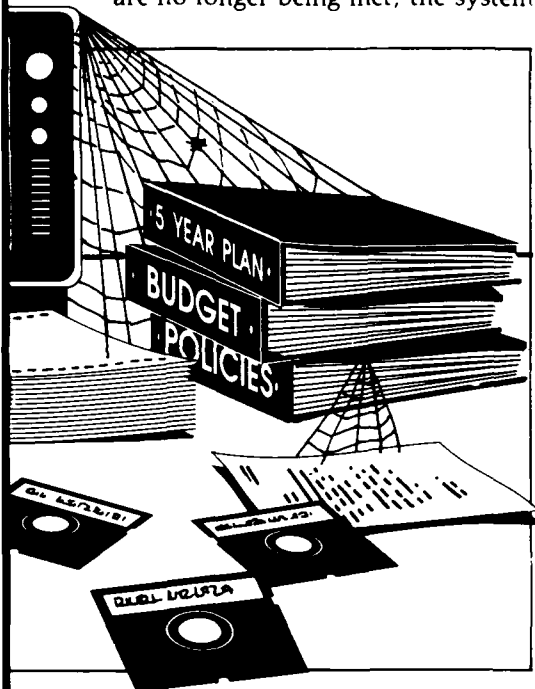
Determining Organizational Systems Atrophy

—*Are the goals of the organization clearly understood by the information center, systems department, and/or the Information Services Director?* All public agencies and military services are established on precise and well-defined goals. Inasmuch as a private sector strategic business plan should outline where the company intends to be beyond the next 5-10 years, public agencies develop specific long-term departmental objectives in line with its goals and policies. On one hand, those objectives must be used to determine program budgets, a plan for controlling and justifying manpower authorizations, projects in research and development, total service-provided output, etc. On the other hand, they allow the IS Director to restrict the catastrophic results of managing to short-term objectives instead of being cognizant of the company goals. Once goals and long-term objectives are understood, the IS director must determine planning factors for transforming information systems support criteria into objectives the department or information center will be measured against. Objectives are specific measuring tools designed to answer efforts and accomplishments in terms of costs, schedules, and technical performance. By quantifying the performance of the information systems against these objectives, the center can continuously measure system effectiveness and reengineer its information systems toward a specific operational and technological architecture.

—*Is a formal plan or policy established requiring a recurring presentation to management to review informations systems effectiveness in meeting its established departmental objectives and organizational goals?* If program accomplishments are formally reviewed quarterly, the information center must be reviewed to determine how it is meeting its program support objectives.

—*Has a budget been established to invest in upgrading information systems that do not meet these objectives?* Usually the answer is yes, but the budget is inadequate. That may be the correct systems answer; however, it is not the correct business answer. There is no public agency searching for an information center manager who needs to spend more money than has been funded for his department, project or program. A budget is a blessed bucket of funds designed to meet at least the minimum requirements and controlled by an appropriate level of management to meet specific demands in work load, supplies, and other systems support services.

—*Is there guidance commonly available to all users and support persons stating upgrade policies and planning approach to be used by the IS department?* End-users and information support persons must be aware of, and have access to, the planning processes involved with up-

grading agency information systems. If the IS manager does not invite encounters with changes in requirements and support needs, he may not be able to get reciprocate response from the user community on organizational planning needs.

Determining Industrial Systems Atrophy

—*Is the technological capability of the company's information systems in compliance with current industrial standards?* There are many considerations for technological standards. However, a global concern for technology refreshment, based on a few industry heuristic measurements, will allow the IS manager enough authority to meet the technological challenge of meeting department objectives.

—*Does the IS budget plan include various ceiling expenditures for contingency costs, tactical planning costs and long-term systems costs?* Contingency costs are usually covered adequately by annual operations and maintenance funding. However, program budgeting to include long-term planned upgrades must provide an appropriate level of authority to obligate, expend, and transfer monies consistent with the IS budget plan.

—*Is the information center well-read and funded to maintain industry awareness of technological offerings, studies, surveys, and to attend seminars and conferences?* Only by continuous involvement with industry changes, and conferring with public- and private-sector technologists can IS planners offer alternatives, design within standards, and execute within an established IS architecture to guard against significant system degrades.

—*Is there a diagram or outline describing the organization's architecture, interfaces,and networking capabilities?* More necessary than a schematic for determining the internal circuitry of a stereo component, a diagram or set of drawings, which visualize the information system's hardware and communications connections, is necessary to determine planning factors for upgrades, replacement of specific hardware pieces, networking plans, and impacts on alternatives plans.

DIAGRAM 1.   ORGANIZATIONAL SYSTEMS ATROPHY

Causes

● Departmental objectives are no longer being met.

● Information systems fail to support departmental accomplishments toward Agency goals.
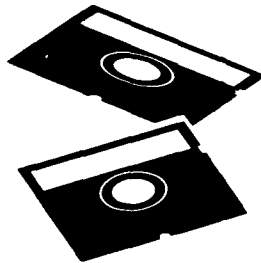
Checkpoints

● Are Goals Clearly Understood?

● Recurring Review of Systems Effectiveness?

● Is the IS Department Budgeted Properly?

● Do Users Understand Upgrade Policy?
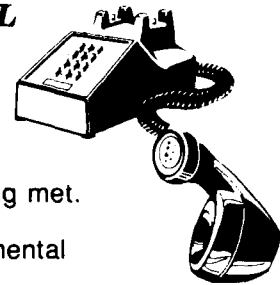
The reason for determining the degree of atrophy is to determine the impact on the effectivensss of the information systems employed for maintaining industrial competitiveness within the vision of agency goals. Those goals are institutionally administered in the information systems support game using a multi-tiered planning approach.

Four Types of Systems Planning

There are four major types of systems planning; strategic, tactical, operational, and contingency. Each has a specific and necessary role for ensuring that Information Systems are in consonance with organizational goals.

Contingency planning is a means for determining immediate actions when problems occur. To be useful, such a plan is built around *prevention* of systems problems such as adequate supplies, reasonable response times established for on-call engineers, and appropriate sparing for major parts.

DIAGRAM 2.   INDUSTRIAL SYSTEMS ATROPHY

Causes

● Changing Technologies

● Failure to Adhere to Standards

Checkpoints

● Compliance With Standards?

● Ceiling Expenditures Controlled?

● Is IS Department Technologically Knowledgeable?

● Are Architecture Diagrams Available?

Operational planning is concerned with departmental needs within the current annual budgeting cycle: usually 6 or 12 months. This plan deals strictly with a 1-year perspective on meeting specific attainable objectives which can be monitored month-by-month to ensure they are being met.
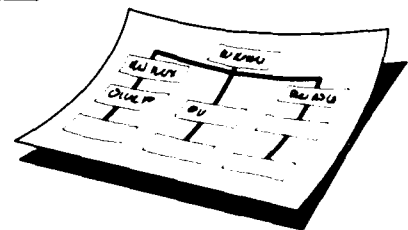
Tactical plans are developed with a 5-year plan in mind. Product lines, research and development, and in-house engineering schemes are expected to be designed, installed, and tested within the framework of a structured program.

Finally, a strategic plan is developed around organizational goals. This plan, obviously developed first, must determine the system's architecture necessary to carry out undermining of organizational requirements during the foreseeable life cycle of the corporation. It is, thus, a strategic information systems architecture plan which describes components and functions of current information systems, their funding approach, and how they can be measured for performance in distinctive roles.

It is here, at the strategic level, that goals are established to develop a road map charting the 5-10 year destiny of the agency, department, or bureau; why it is established and where it hopes to be in the future.

Goals are the edifice of organization. Departments and management structures are developed consistent with these goals. In order for each department to fulfill its role in the agency, objective criteria are established to measure each activity's value and necessity in reaching those goals. To measure systems degradation and focus on needs for planning, budgeting, and programming changes to the existing system's environment, the IS manager must develop and maintain a long-range architecture plan.

Developing
Strategic Information
Systems Architecture Plan
(SISAP)

The SISAP must first reflect the agency's planning goals and policy for use and upgrades of information systems.

DIAGRAM 3. STRATEGIC INFORMATION SYSTEMS ARCHITECTURE PLAN

Part I

Architecture Diagram of:
Existing System Configuration
- Hardware
- Communications
- Software

Part II

Policies For:
- Reengineering
- Validation of Requirements
- Standards
- Technology Refreshment
- Evolving Hi-Tech Changes

Part III

Glossary Of Each
System Component:
- Technical Info
- Recurring/Non-recurring Costs
- Support Plan
- Responsible Dept.
- Comm Support Required

Part IV

Architectural Diagram of
Proposed System When Completed:
- Hardware
- Communications
- Software

Next, an established body or position must control the SISAP document, maintain its periodic updates, and report to a higher authority periodically to ensure its utility.

The SISAP contains a minimum of four major divisions. It must illustrate an architecture of current communications and computer interfaces. It must provide an approach to re-engineering and technological refreshment; an approved policy for evolving hi-tech changes. It must contain an exhaustive glossary containing technical, support, and funding criteria for each automated component and communications circuit used. Finally, as a minimum, it should contain strategic architectural illustration and plan. This would be a picture of how the company's information systems will look when all planned projects are completed; i.e., allowing the left hand to see what the right hand is doing.

With the SISAP in hand, the information center manager has a clear, long-term vision of where his or information support systems are heading. This document is the baseline for configuration management of the agency's IS support plan. It allows the IC manager to plan with diligence, deliberate with caution, and effectively control changes in requirements and discipline toward standards.

However, validation of requirements is even more nebulous than *fuzzy logic*, and designing a plan toward standardizing hardware and software in any environment is expensive (to say the least) and, in

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many junctures, risky. Nonetheless, they both must be addressed when determining the feasibility of reengineering for the purpose of impeding major systems deterioration.

Determining Validity of Requirements

How do we determine the feasibility of requirements? Simply stated, when objective criteria can be used to explain a positive change in degree of specificity toward the achievement of agency goals, then the requirement has *feasibility*. When it is clearly measured that specific departmental objectives cannot be attained without the change, then the requirement has *validity*.

For example, a command and control element may state in writing that a microcomputer is needed to replace an existing dumb Teletype terminal because it is mission essential to monitor a 24-hour-a-day, 7-day-a-week circuit. Where is the requirement in this case?

The operational requirement is to monitor traffic received over a specific communications circuit and respond as required. But what is the technological requirement; or is there such a thing as a technological requirement? No. There may be an accepted technological *solution* to meet an operational *requirement*, but there is no such thing as a user-stated technological requirement, such as a new microcomputer, in this case.

The degree of specificity in technological requirements must be stated in terms as clearly as organizational goals and supporting departmental objectives. Restated as a requirement, the command and control element must state the operational need in measurable terms in order to determine a technical solution. A requirement must be stated in terms of degree, time, and cost in order to qualify against organizational objectives.

The command and control element must be able to receive, store, manipulate, read, and print a minimum of 150 classified messages per day using circuit XYZ. The circuit must be monitored 24 hours a day, 7 days a week to determine impacts on the command and control of

assigned resources. Without this capability, a significant degrade will occur in the commander's exercise of timely control over assigned forces, supplies, and spares. That is a stated requirement. It is in measurable terms and it specifies to a degree what is required of the task. While it is the user's responsibility to state requirements, it is the systems planner who must interpret and articulate them into technological solutions which provide an acquisition strategy, funding profile, and fit within the organization's Strategic Information Systems Architecture Plan (SISAP).

Necessity of Standards

The pursuit of standards is another valid reason for reengineering. Information systems tend to deteriorate relevant to their move away from industrial *standardization*. Heuristically speaking, deterioration is flagged by software modernization and the resulting standards that industry-standard software drives. There are many other industry standards that must be observed. The recent contract hold against Honeywell Federal Systems to supply Apple Macintosh computers on the WWMCCS ADP Modernization program is due to a dispute over noncompliance with the specification for an *open systems* capability. More than likely, a POSIX platform (to standardize use of the many UNIX varieties) will eventually have to be complied with to resolve the issue.

In order for standards to be enforced, they must be maintainable and compatible with the strategic architecture plan. When end-users make purchases of non-standard equipment, policy must be established that they will be refused support in terms of training, technical expertise, supplies, and upgrades. Because of the inability to provide support for proliferating microcomputers and varying applications, some commanders have issued a moratorium against the acquisition of any more micros until a standards plan, architecture, and support plan is put into place.

Industry standards to be observed must be in compliance with agency policies. For example, the Department of Defense has implemented policies governing small computer acquisitions, LAN development projects, and engineering and installation support activities on departmental programs. The National Institute of Standards & Technology and Federal Information Processing Standards are key funded efforts to enforce government-wide standardized architectures.

How and why does standards-compliance help meet organizational goals? It allows government buyers the ability to procure compatible technologies, establish standard environments, structure workable architectures which make upgrades simpler to design and implement, and install software which maintains portability across various systems.

DIAGRAM 4. THE SISAP AS A PLANNING TOOL
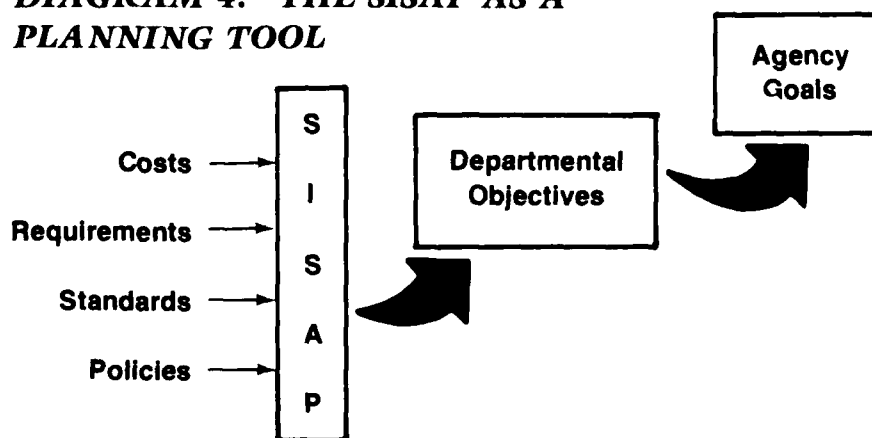
The SISAP is used as a planning tool to guard against Industrial Systems Atrophy and as a configuration management tool for preventing Organizational Systems Atrophy.

Summary

Anyone who has administered a data center has quickly realized that planning usually takes a back seat to other IS demands such as individual user whims and organizational budget restraints. However, a strategic IS architecture plan must be developed, reviewed, updated, and applied to inspire consistency with agency goals. It should be *offered* to all departments to participate in systems planning but it must be *required* of all user activities to review and update their long-range requirements in line with the architecture and organizational policies in the plan. Even though long-range systems planning will not solve the volatility problem of a system's natural tendency toward obsolescence, this comprehensive planning document will serve adequately as a focal point for determining feasibility of information systems upgrades.

Systems atrophy can be measured and controlled for minimal impact on agency goals with proper maintenance of the SISAP. The document must incorporate policy on determining the validity of requirements and policy governing adherence to standards, systems components and hardware. The magnitude of systems deterioration will provide the necessity of upgrading when weighted against the organization's IS policies. Once again, systems atrophy need not be taken as a negative finding; rather, a measurement tool for determining when systems upgrades are required.

There is no question that systems will deteriorate. And there is no question that service-conscious public agencies will upgrade their information systems. The purpose of the SISAF is to measure objectively corporate policy against the magnitude of systems deterioration to maintain a technological equilibrium consistent with predetermined agency goals.

INFORMATION SYSTEMS ACQUISITION

tures are discussed. Included are the status of the program baseline, results of the CSSR analysis, status of the execution of available funds, and progress against the schedule and the technical status of the development.

8. *Oversight by Office of the Secretary of Defense.* The Major Automated Information Systems Review Council (MAISRC), an OSD decision-making body, now a committee to the DAB for weapon systems, approved the LMS Modernization Program baseline in 1984 established a 15 percent threshold on cost and schedule. Any breach of these thresholds required a special briefing to the MAISRC to determine if development should be continued. Every quarter, program status is provided to the OSD MAISRC and a briefing is done every 6 months. Recently, the MAISRC directed milestone revalidations on several programs and preparation of more extensive cost documentation. The Air Force Automated Information Systems Acquisition Review Council (AISARC) has milestone approval authority for the LMS programs and has validated all programs briefed to it under the MAISRC directive. Independent cost analyses have been prepared by the AFLC comptroller which have compared favorably to the program office estimates of life cycle cost.

Summary

The Logistics Management System (LMS) modernization program is a major acquisition program of computer hardware and software development from contract sources that is critical to the logistics function. Through the use of cost program management disciplines similar to those used in weapon system acquisitions, the Logistics Management System Center (AFLC) has been able to obtain sufficient visibility to adequately monitor and control the costs of the LMS modernization programs.

Partial List of Applicable Guidance Documents

1. MIL-STD-881 A, "Work Breakdown Structure for Defense Material Items."

2. DODD 7920.1, Life-Cycle Management of Automated Information Systems (AIS).

3. DODI 7920.2, Major Automated Information Systems Approval Process.

4. SGT 800-25, Acquisition Program Baselining.

5. AFLCP 173-2, Cost Schedule Management of Non-Major Contracts (C SSR) Joint Guide.

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Are you heading for

ORGANIZATIONAL BANKRUPTCY?
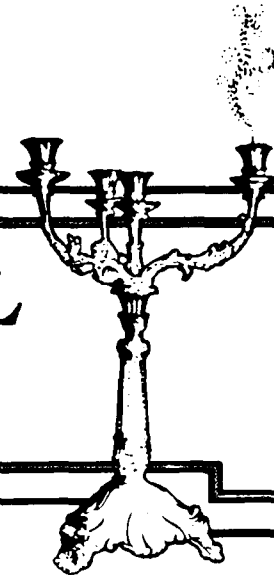
Theodore L. Bloomer

Whether or not our organizations are approaching bankruptcy is not a question officials in public service traditionally worry about. Few are compelled to strive for cost effectiveness, meeting customer needs and operating at levels ensuring organizational survival. In addition, discussions with officials indicate most of us have not developed rigorous knowledge and skills to conduct critical are-we-in-danger-of-going-bankrupt examinations of our business practices. We should not feel too alienated, however: everyday, newspapers question if executives in private industry are overly blessed with those abilities. This article focuses upon the knowledge and skills for those of us in the public sector.

Public Service:
A Special Calling

We are charged with the responsibility to ensure the viability of our organizations; that charge is implicit in the philosophical concepts of democratic governance. The whole notion of public service is to serve! A career that honors service to country is compelling to most of us. However, in the austere budget climate today, survival of organiza-

tions providing services is no longer sacrosanct; that is, the question of affordability, rather than priorities or needs of the public, is challenged by legislators, executives and taxpayers. Those powers are eliminating service organizations based upon their relative health and proximity to bankruptcy, rather than the value of their contributions to the public. I'm not sure they're wrong. It is a new ball game for many of us. Business-as-usual is not sufficient anymore.

The Truth Is:
It's Tougher In
The Public Service

As government officials, we have a couple of cultural strikes against us.

The first is our accounting (budget) systems probably are not oriented toward helping determine the overall strength and competitive position of our organizations. Historically, budget people have too much power over program effectiveness, and maintain their books with a mind-set toward obligation rates and reappor-

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tionment, rather than helping analyze fiscal and operational health. Products of the budget people are for their use, not ours and, frequently, information is dated.

The second strike is absense of a culture fostering accountability for organizational and, therefore, service survival. When it becomes too warm in the kitchen, some colleagues say "No big deal, I can get a job next door." In most cases, that is true. Absence of personal commitment toward providing service limits long-term survival of the organization.

The lack of drive and motivation for money, and the press for the bottom line (PROFIT), is quoted often as the fundamental reasons the private-sector manager is more effective. Hogwash! Our peers in the private sector—those still around—discovered that business-as-usual for them was a gross mistake. Assuming we are perceptive enough to learn from their mistakes and successes, one would think the enlightened public official would have two obvious lines of inquiry:

—What is the health of the organization?

—What needs to be done to foster accountability?

These questions will be developed in some detail. However, a basic concern, warrants review; that is, why is it so difficult to develop and initiate organizational changes?

Why Don't We See More Self-Directed Change?

Research of organizational change is specific on at least one point; we are less likely to change our modus operandi without fairly strong evidence that our current operational path is leading to serious trouble. Many consultants, internal and external, agree that, aside from the superficial, and cosmetic changes, real leadership and cultural shifts do not occur until an irresistible force demands it. In private industry, that force is called *bankruptcy*. Sometimes that force is a boss asking: "Are you independently wealthy?" I will define bankruptcy signals in the public sector. Let's start with the first line of inquiry—the health of your organization.

What Is Your Current Situation?

There are a few classic activities going on in organizations which, for the most part, are invisible to casual inspection. Like the FBI's "Most Wanted List," following is a list of the three *Most Unwanted* business practices. There are many more but you will be well-served to begin with these: The rest will follow of their own volition.

Number One On the List: The Hidden Factory

The hidden factory is the product of an often-accepted concept that "we don't have the time to do it right the first time but will make the time to fix it when it bounces back" (the wish being that it won't bounce back). Many consultants and production-control people agree that as much as 35-40 percent of our time is spent fixing inputs from our suppliers, and reworking our products when customers send them back. Also, due to the press of time and priorities, we are guilty of passing less than quality work to the next station in our production lines, creating someone else's "garbage in." Your employees will say they could improve their quality and productivity dramatically if sloppy work were not passed to them.

The hidden factory, as implied by its name, is not readily visible to the organization's leadership. We never hear a significant executive say "I'm going out to hunt for hidden factories today." Many a surviving executive does just that. One purpose of the "management by walking around," is to do precisely that—stumbling upon rework activities. Those officials are serious about searching for hidden factories because they know the serious multiplier effect of the hidden factory; i.e., resources (people, machinery, inventory, time) dedicated toward fixing work that should have been done right the first time will not be committed against new work that is already in the pipeline. In other words, those officials seek out and destroy a negative spiral.

You are going bankrupt if you do not have specific operational activities to reduce rework.

Accounting Can Help

Most of us in the public service do not construct accurate accounting systems to "see" into our operations. Our systems focus too much upon dollars obligated according to a planning line on a chart. At least one major weapons system command is looking at budget figures in relationship to work in the pipeline. Analysis of the relationship in that display provides a better view of the organization's health, and gives early warning signals to senior leadership to flex their leadership muscle and get their products to the air wings in the fleet.

It is not necessary to have a complicated or paper-intense, CPA-certified accounting system. You absolutely *do* need a formal process that lets you know how well your product is flowing and displays rework loca-

tions, not to determine *if* you have any rework but to determine *how much rework* you have. Employees will become aware instantly of your efforts to reduce, if not stop, rework, a monumental step toward recapturing their commitment.

> You are going bankrupt if you do not have specific operational activities to reduce rework. You will go bankrupt if you do not continuously improve them, as all systems decay without proper care.

Number Two On The List: Work Processes

Those of us surveying work forces find employees always complain about crazy systems and processes supervisors and managers put in place; systems and processes, from their points of view, which honor hard rather than smart work. For example, when asked "How much more quality work could (would) you produce if the work systems and processes were better?" employees responded:

No increase	10%
0-15% Increase	25%
Up to 30% Increase	40%
At least 40% Increase	20%
Up to 50% or More Increase	05%

Employees in your organization fall somewhere in this scale. These figures indicate organizations have more untapped resources than they realize. This untapped resource may be the most important reason officials frequently are denied additional resources.

In the classroom, I offer a cold beer and a great pastrami sandwich to anyone proving me wrong concerning their employees' concerns about crazy systems and processes in their organizations. To date: no takers. My point is: Why don't we do something about it? The general answer is that most public service leaders have not felt the need to and, therefore, have not gained the skill or knowledge necessary to direct or make necessary fixes.

We are not attempting to train readers to become process analysts. However, we are obligated to determine if our processes, which roll up into systems, are effective. More im-

portant, do we know what our dominant product lines are? You will find one successful approach to determine the dominant product line is to determine the dominant customer. You can determine rather effectively your most dominant product line when you audit backward from your dominant customer (Figure 1).

You make a good start if a bright person leads an effort to diagram the product line leading to your customer. That diagram, PERT or GANTT-like displays, is critical to starting your analytical process. You will uncover blatant serial and concurrent process flaws, suppliers indifferent to your work-in-process, wasted time and materials, queue issues, inordinate decision thresholds, and others too often pointing to a major problem—no one is in charge of the entire process.

Usually we find accountability is well-defined for fractured parts of the process only. Making sure a specific person or group understands, supervises, and leads the overall process may be the biggest step toward process improvement and product quality. It is important to insist people working and playing in the process participate in the analysis and development of solutions. They know shortcuts, working jigs and quality upgrades. Should your leadership really want things to happen, rather than more studies, you will start to change your practices. Almost magically, levels of commitment by all will rise noticeably, the second of our inquiries.

> You are going bankrupt if you do not have a strategy to improve your product line processes and systems. You will go bankrupt if you do not continuously improve them because all systems decay without proper care.

**Number Three
On The List:
Make-Believe Training**

Most of us have discovered first-line supervisors are too busy, don't care or, in most cases, are unable to conduct effective task analysis and subsequent training needs assessments. Let me return to the class-

FIGURE 1. INPUT/OUTPUT CHART
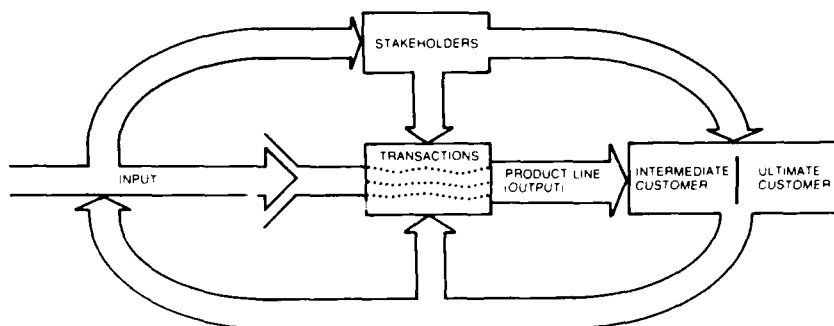
room. Remember the cold beer and pastrami sandwich offer? This time I wager that approximately 80 percent of the training dollar is spent by approximately 20 percent of the employees. If that isn't crazy enough, the bet goes on to declare that 90 percent of the training is *employee* generated, rather than reflecting management and organizational mission requirements. No takers? I am not speaking of real training at tactical commands still deploying and training for combat. I'm talking about the inordinate training going on that has little or nothing to do with improving our services and products.

Only on a few occasions in my 27 years of government service have I has a first-line supervisor sit down with me and discuss my training needs as related to real-world work requirements. Without that dialogue, like so many other employees, I offered potential courses *I wanted* to take. Did those courses help me get my work done better? Probably not. Evidence seems to indicate most supervisors have little or no serious concern for training. Why is that? Here are three major reasons.

—Too many supervisors pride themselves as having learned from the School of Hard Knocks. Why shouldn't everyone else?

—Training in general is too theoretical and has limited value. It is not immediately apparent that training is related to actual on-the-job performance.

—The granddaddy of them all, the all-time negative fantasy is: The minute a supervisor releases an employee to attend a training session, the world will fall apart and the

supervisor, of course, will be blind-sided and/or fired.

A quick way to see the 80-20 percent phenomena is for someone on your staff to run a quick tape of your total training obligation rates. You will find approximately 80 percent of your training dollar is being spent by 20 percent of your people. You may find another lopsided utilization rate. For example, if you have five major departments reporting to you, one is likely to be spending the bulk of your training dollar.

Make-believe training is further entrenched because marketing experts selling training want you to believe that "value-gained" testing and analysis is all right for the rest of the world, but not for training. It is interesting to see how quickly those sales people change when confronted with your new policy on training; i.e., "in this organization we do not spend our critical dollars on training that is not performance-based, not directly related to mission and operational requirements, and cannot be measured with front-end performance criteria."

Ideally, one should have specific data inputs that evaluate the overall training effort. Resist traditional attempts by trainers to prove value-gained by displaying impressive completed training/planned training percentages. The other unjustified performance indicator is their continuous use of impressive dollars spent/dollars planned percentages. Above all, resist glowing displays on "student feedback," probably the worst performance criteria of all. All three of these classic indicators have nothing to do with the value of the *training*. Insist upon two absolute

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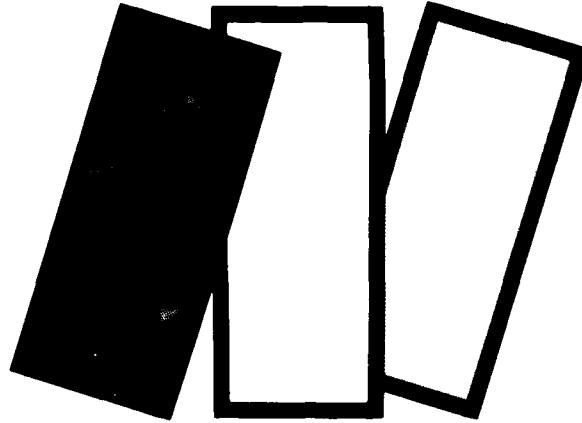
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The Role of
ANALYSIS
IN C/SCSC

A responsible analyst is an information engineer involved in the decision process.

Captain David S. Christensen, Ph.D., USAF

The President has the Office of Management and Budget as the analytical arm to deal with budget decisions. The Congress has the Congressional Budget Office. The Department of Defense has thousands of cost, budget and price analysts. How can this analytical expertise be utilized effectively?

This paper answers this question by addressing how an analyst can help the decision-maker. For focus, it addresses the role of the analyst involved with the DOD Cost/Schedule Control Systems Criteria and related performance reports.

An analyst should be involved in each step of responsible decision-making (Chart 1). First, the analyst should understand the decision context. Who are the decision-makers? What are their decisions?

Second, the analyst should understand the database. What are the basic data elements? How are the data generated? How is the database controlled?

Third, the analyst should understand basic techniques in transforming data into information. What analytical techniques are available? What tabular and graphical presentation methods best communicate the information? What are the underlying assumptions and limitations of these methods?

In short, it is not enough merely to manipulate some database. A responsible analyst is more than a "number cruncher." A responsible analyst is an information engineer or broker who is actively involved in facilitating the decision process.

Discovering Decision Context

The stated purpose of the Cost/Schedule Control Systems Criteria is to foster responsible decision-making.[1] A responsible decision is based on information. Information can be defined as data that are useful for decisions.[2] To be useful for decisions, data must be relevant and reliable. Data reliability depends on the contractor's management control system. If the contractor complies with the 35 generic criteria for management control systems detailed in the DOD *Joint Implementation Guide*, the DOD assumes that the data provided on standardized contractor performance reports are reliable. Data relevance depends on the decision context, which involves factors relating to the decision problem and the decision-maker.

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The analyst's customer is the decision-maker. One of the tenants of Total Quality Management is to know the customer. The responsible analyst should work with the decision-maker to discover the kinds of decisions likely to be required. Learning about these problems should help specify the information requirement!

In the context of C/SCSC, decisions involve either implementation and surveillance issues, or the use of performance measurement data in assessing the cost, schedule, or technical performance of the contract. Examples of decision-makers dealing with implementation surveillance issues include the team chief, surveillance monitor, review director, and the Performance Measurement Joint Executive Group. These decision-makers generally are responsible for interpreting the intent of the criteria and deciding if the contractor's management control system complies with the criteria. Specific responsibilities are described in the *Joint Implementation Guide* and the *Joint Surveillance Guide*.

Examples of decision-makers who must rely on performance measurement data include government program managers and resource providers. These decision-makers monitor the cost, schedule, and technical progress on the contract. Again, the responsible analyst should

CHART 1. THE ANALYST'S CUSTOMER IS THE DECISION-MAKER

RESPONSIBLE ANALYSIS	RESPONSIBLE DECISION-MAKING
► Know the decision context.	► Determine information requirements.
► Know database and system that generates it.	► Evaluate quality of information.
► Know tools of analysis and their limitations.	► Use information.

ANALYST	DECISION-MAKER

meet with these decision-makers regularly to establish rapport and a feeling of mutual respect.

For both groups of decision-makers, the decision problems demand considerable judgment and cover complex issues in multiple functional areas. When confronted with complexity, many decision-makers will either request more data or focus their attention on some area consistent with their background (e.g., engineering, accounting or production). In either case the result can be dysfunctional: more data do not necessarily lead to better decisions; and a penchant for functionally specific data can leave the decision-maker unaware of problems outside of that functional area.

The responsible analyst can be of great help here by filtering the database and by knowing the decision-maker well enough to recognize the latter's penchant for some functional area. For example, a team chief on a demonstration review may have considerable experience with the budgeting area. Under the stress of completing the review in a timely manner, the team chief unwittingly may focus too much attention on budgeting at the expense of other important areas like planning or accounting. The responsible analyst should tactfully bring this to the decision-maker's attention. This is only possible if the decision-maker and analyst have established a favorable working relationship.

The analyst may help by becoming familiar with the typical kinds of deficiencies or problems encountered.

In the implementation and surveillance area, several studies have documented a "corporate memory" of C/SCSC experiences and lessons learned. A recent paper, "C/SCSC Lessons Learned Theoretical Framework" (1988), for example, details problems and issues commonly encountered in C/SCSC.[3] It behooves the responsible analyst to become familiar with these problems by reading C/SCSC literature, attending conferences, and participating in professional organizations. The appendix to this paper lists selected publications and professional organizations relevant to the C/SCSC area.

Understanding Database

In addition to understanding the decision context, the analyst must understand the database and how it is controlled. Assuming that traditional data sources are useful (relevant and reliable) for future decisions is dangerous. Hopefully, by understanding the decision context, the analyst will be able to eliminate data that are not relevant; and by understanding the related control system, the analyst can properly assess reliability of the database. The database should be considered unreliable if existing controls are either inadequate or not functioning. If controls are found deficient, the analyst should warn the decision-maker that the database is suspect and take steps to strengthen the controls. If controls are adequate but not followed, the analyst should again caution the decision-maker that the database is not reliable and suggest that existing controls be followed.

There are five basic data elements in performance reporting under C/SCSC: budgeted cost of work scheduled (BCWS); budgeted cost of work performed (BCWP); actual cost of work performed (ACQP); budget at completion (BAC); and estimate at completion (EAC). Definitions and related controls of these data elements are detailed in the *Joint Implementation Guide.* Each of these elements are reported as specific columns on the standardized performance reports prepared by DOD contractors.

The prudent analyst must understand these elements, and the relationships between them. For example, at any given time and for any given element of work, the contractor's estimate at completion should never be less than the cumulative actual cost of work performed for that same element of work. (This follows from the definition of EAC, which is defined as sum of actual costs to date and the estimated cost of the remaining work on the contract). Similarly, the budgeted cost of work performed should never be greater than the budget at completion for the same element of work. By understanding these basic data elements and relationships the analyst can assess more effectively potential reliability of performance reports.

In addition, the analyst should thoroughly understand the system and controls that generate the database. Understanding how to u e an information system is not enough. Although the following citation addresses the need for managers to understand their management information system (MIS), it is an equally applicable challenge to the analyst:

> Most MIS designers seek to make their systems as innocuous and unobtrusive as possible to managers lest they become frightened. The designers try to provide managers with very easy access to the system and assure them that they need to know nothing about it. The designers usually succeed in keeping managers ignorant in this regard. This leaves the managers unable to evaluate the MIS as a whole....In failing to evaluate their MIS, man-

agers delegate much of the control of the organization to the system designers and operators who may have many virtues, but managerial competence is seldom among them.[4]

The Cost/Schedule Control Systems Criteria outline 35 commonsense standards for management control systems. The analyst must not only understand these criteria, but how they apply in the specific decision context. Ideally, analysts should thus be part of implementation or surveillance teams involved with their contractors. This will provide insight that is not likely available from behind a desk.

Understanding Techniques Of Analysis

The responsible analyst should be thoroughly familiar with basic analysis techniques and apply them appropriately. Understanding the decision context, database, and system that generates the data can help determine appropriate techniques and are thus necessary precursors to this third step in responsible analysis: transforming data into information. There are many potentially useful algebraic and graphical techniques. In addition, most techniques have implicit assumptions about the data and the decision-maker.

The responsible analyst should learn the techniques and test implicit assumptions before relying on results. For example, a common technique is linear regression analysis. In addition to being able to apply regression analysis, the analyst should evaluate critical assumptions like linearity, and the independence of the errors across observations.

In the context of C/SCSC, the basic data elements are transformed into information by computing cost and schedule variances and indices. For example, cost variances are computed as the difference between BCWP and ACWP; schedule variances are computed as the difference between BCWP and BCWS; and the cost performance index (CPI) is computed as the ratio of BCWP divided by ACWP. (Shown in Formula 1.)

These variances and ratios can be computed and graphed using current, cumulative, or average data values for any element of work on the contract. As such, they represent an effective and versatile way to summarize an enormous amount of data. An excellent guide to generating and interpreting this kind of information is the *Air Force System Command Pamphlet 173-4*, "Guide to Analysis of Contractor Cost Data," (Sept. 1, '89).

Another common analytical technique used in C/SCSC is to compute an independent estimate at completion for comparison purposes. The generic formula for estimate at completion is in Formula 2.

The responsible analyst should understand fully the assumptions implicit in this formula. For example, while a performance index (e.g., CPI) is routinely used to adjust the remaining work on the contract (BAC − BCWPcum) to a more reasonable value, its arbitrary use is dangerous. The index usually is based on past performance of the contractor and calculated as the ratio of BCWP to either BCWS or ACWP. When the analyst uses cumulative data, the analyst is implicitly assuming that what has happened since start of the contract is recurrent and reflective of the future. If the early months on the contract are not indicative of the efficiencies presently being demonstrated by the contrac-

tor, then the use of cumulative data for the performance index is not appropriate.

In another example, the use of budget at completion (BAC) in the generic EAC formula ignores possible application of management reserve budget to future work. If the contractor is likely to use management reserve budget by the end of the contract, then it should probably be added or otherwise included in the EAC computation. In short, the responsible analyst should understand the assumptions implicit in the formulas and other computations and communicate them to the decision-maker.

In addition to being aware and careful with algebraic analytical techniques, the analyst should understand the strengths and limitations of graphical techniques. While graphs can be excellent tools for communicating information to the decision-maker, there are pitfalls that the responsible analyst should avoid. A number of writers have identified criteria for high integrity graphics.[5,6,7] If the criteria are followed, the chart will faithfully represent data and communicate the information intended. If not followed, the chart can be extremely misleading. In general, the graphics criteria are caveats about arbitrary scale manipulation, inadequate or otherwise misleading labeling, excessive use of "chart junk" (enhancements) to decorate a chart, and other rules intended to prevent the viewer from being mislead. With the wide availability of powerful graphics software, the temptation to play with various graphical types and parameters is irresistible. In the process, the analyst may unwittingly create a misleading graphic. The strata charts in Figures 1 and 2, for example, illustrate how the incorrect placement of strata can be misleading. The analyst or decision-maker may conclude incorrectly that annual indirect costs are decreasing from Figure 2 when
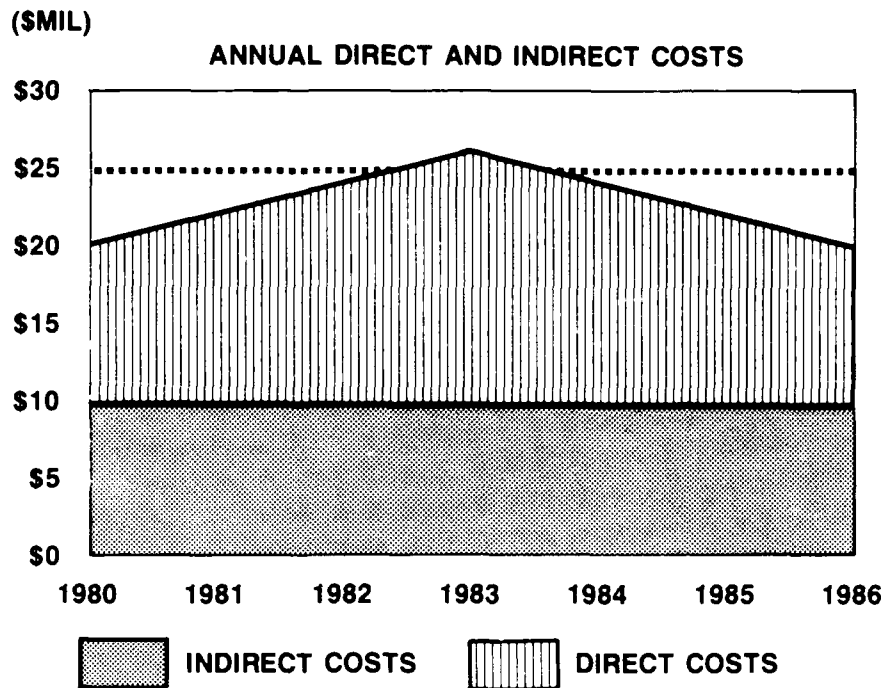
Formula 2.

$$EAC = ACWPcum + (BAC - BCWPcum) \text{ Performance Index}$$
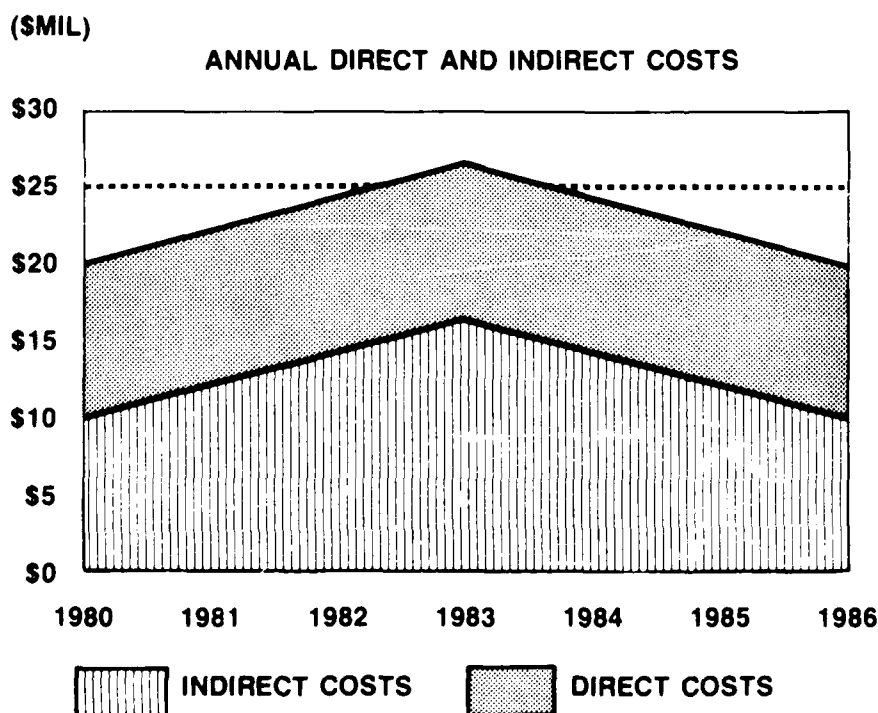
Formula 1.

$$Cost\ Variance = BCWP - ACWP$$

$$Schedule\ Variance = BCWP - BCWS$$

$$Cost\ Performance\ Index = BCWP/ACWP$$

FIGURE 1. STRATA CHART
(STRATA ORDER CORRECT)

($MIL)

ANNUAL DIRECT AND INDIRECT COSTS

INDIRECT COSTS   DIRECT COSTS

FIGURE 2. STRATA CHART
(STRATA ORDER INCORRECT)

($MIL)

ANNUAL DIRECT AND INDIRECT COSTS

INDIRECT COSTS   DIRECT COSTS

in fact, they are constant. In strata charts, the stratum with the least variability should be on the bottom.

Unfortunately, misleading graphics may sometimes be intentional. For example, research has demonstrated that misleading graphics appear to be highly associated with adverse financial trends in published financial statements.[8] It appears the temptation to create a false impression of prosperity with misleading graphics is too great for some companies. On occasion, the analyst is an advocate. An ethical analyst should resist the temptation to make the picture appear better than the underlying data. Knowingly misleading the decision-maker is unethical: unknowingly misleading the decision-maker is irresponsible.

Another potential pitfall relevant to analytical technique concerns what Kaplan calls "the law of the instruments." Kaplan explains as follows: "Give a small boy a hammer, and he will find that everything he encounters needs pounding."[9] Analysis necessarily requires algebraic and graphical techniques. The problem is that some analysts love specific techniques (instruments) so much that their analysis does not go beyond the application of their favorite technique. While regression analysis is a wonderfully powerful technique, for example, it is not always the most appropriate technique. The responsible analyst should recognize personal biases and be willing to go beyond the information generated by his favorite technique. To paraphrase Kaplan, give an analyst some graphics software, and he or she will happily generate charts of every row and column on a cost-performance report. In short, good analysis is not defined by the type, variety, or relative sophistication of the analytical techniques applied, but by the information the techniques generate.

Conclusion

The responsible analyst should be involved in the entire decision process. The analyst's customer is the decision-maker. To help the decision-maker determine the information re-

WHOSE IDEA WAS IT ANYWAY?

Captain Eugene J. Pickarz, Jr., USAF

In these days of defense spending cuts, program cancellations, and total quality management (TQM), there is a continual search within the acquisition community to find ways to maximize cost savings. Ironically, one of the best methods has been around for more than two decades. That is value engineering. More often than not, the value engineering program is under-utilized because those in the best position to capitalize on it simply don't "know the rules." This article will shed some light on a crucial issue, idea ownership as it relates to the value engineering program.

The Federal Acquisition Regulation (FAR) provides for two value engineering (VE) approaches.

The first is an incentive approach in which contractor participation is voluntary and the contractor uses its own resources to develop and submit any value engineering change proposals (VECPs).[1]

The second approach is a mandatory program in which the government requires and pays for a specific VE effort.[2] It is the first approach, the incentive program, on which this article focuses.

Using the VE-incentive program, a contractor is rewarded for cost-saving ideas by providing it a share of those savings. But, the government can initiate cost-saving ideas via a

value engineering proposal (VEP) by directing the contractor to study and, if found cost effective, to direct a contractual change incorporating the "better way" to perform the contract. In this second instance, the government gets 100 percent of the cost savings and the contractor is not entitled to a share thereof. The reason is simple; the government had the idea first.

Herein lies the key issue of this article and case; namely, do the originators of a VE idea always get the proper savings share and recognition due them? This article shall present the case that merely having a VE idea does not automatically establish the ownership rights of that idea, unless positive action is taken by the originator.

Date of Title and Ownership

Establishing the date of title and ownership of a VE idea is of paramount importance for later actions of either approval or disapproval of a
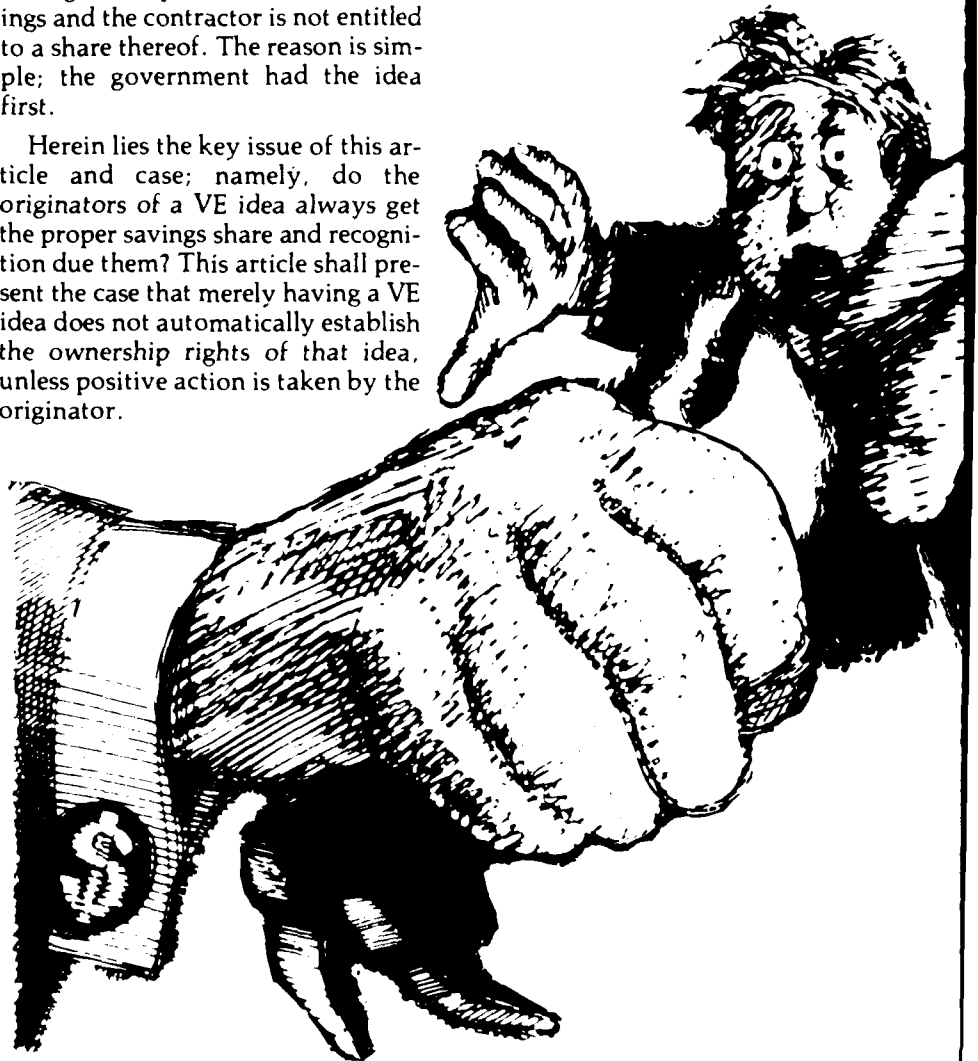
Captain Pickarz is Contracting Officer with the Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio

VECP. This is because the actions of the government can "constructively accept" a VECP, prior to formal acceptance or disapproval of the VECP. In other words, if the contractor, by its actions, clearly establishes its intent to submit a VECP (and subsequently does so), and the government later "constructively accepts" the VE idea by its actions, the government will be stopped from later claiming the idea was not the contractor's, disapproving the VECP, and refusing to share the savings it has reaped from incorporating the VECP.

The key here is "action" on the part of the originator of the idea. Even if the government "plants the seed" for a VE change idea, it will be unsuccessful in later claiming the idea as its own (after the contractor establishes ownership via a VECP submittal), unless it takes the action to initiate the VE change. To illustrate this confusing concept a "real world" example is helpful.
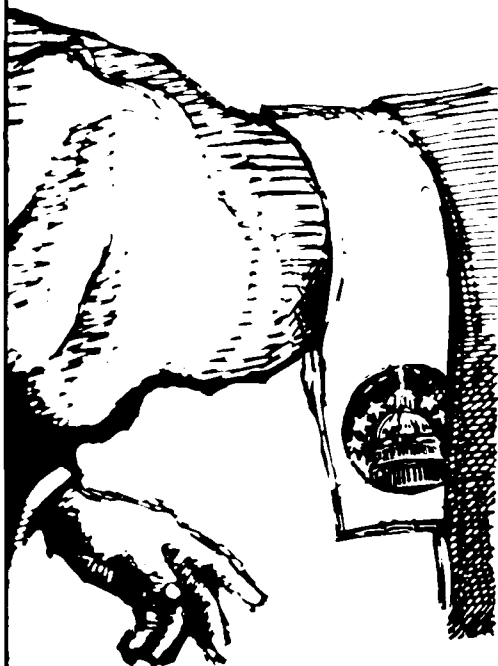
Negotiations between the government and an airframe contractor were underway in June 1987 for a major aircraft buy involving several end-users. As is usually the case on acquisitions for complex aircraft systems, myriad configuration changes were in various stages of review and had to be "nailed down" to baseline the aircraft configurations and complete negotiations.

During the configuration specification review process, the government contracting officer (CO) requested and later received review comments of the contractor's configuration baseline specification from the program office. Said review clearly requested a deletion of several components which were no longer desir by the end-users. (Note: It was determined that this would not constitute a "reduction in deliverable end-item quantities only," as defined by the FAR.) In the weeks that passed subsequent to the request for deletion of items and completion of negotiations in August 1987, no formal action was taken on the part of the government to notify the contractor in writing to remove components from the aircraft specifications. As a result, the aircraft specifications at time of contract award contained the undesired components.

Stop Work Order

In October, the contractor notified the buying activity that it was pursuing a VE study to delete certain components on the aircraft for which it just signed a contract to produce. The components were, oddly enough, those that were the subject of previous program office internal discussions. Only 3 months after the contractor's study notification, the government issued a Stop Work Order for the components in question in January 1988. The Stop Work Order requested the contractor to "submit any impacts of the cancellation/termination."

The contractor responded to the Stop Work Order request for "inputs" with a VECP for the requested deletions of componentry in December 1988. It is important to note that this VECP was the result of the study initiated by the contractor earlier but was the first instance where the contractor formally solicited an approval or disapproval of the VECP "idea," yet all previous contractor correspondence referencing the change had inferred a VECP was forthcoming.

In March 1989, the configuration control board in the program office disapproved the VECP based largely on recommendations of program office engineering personnel that deletions were, in fact, the program office's idea and not the contractor's. The contractor responded to the disapproval with a further reiteration of its request for approval of the VECP stating it did, in fact, meet all requirements of the value engineering clause of the subject contract.

The Commanding Officer, with the advice of legal counsel, then made the painful decision (with concurrence of the program office), to approve the VECP. While this may appear to be a poor decision at first, since the government in all probability "had the idea to delete the componentry first," one must look carefully to the facts and case law and conclude there was no other choice. Let's look at three major factors that led to the decision.

Disputes Clause

The first factor to consider is that although a contracting officer's decision rejecting a value engineering incentive (VEI) proposal is final and not subject to the disputes clause, once a contractor's VEI proposal has been accepted, a contracting officer's rejection of the contractor's claim for the benefits provided by the VEI clause is subject to the disputes clause.[3]

In the case discussed herein, the VECP was, in fact, "constructively accepted" via the Stop Work Order which incorporated the configuration changes resulting from the deleted componentry. Since the government had reaped the benefits of incorporating the technical change, it was effectively estopped from disapproving the VECP for those changes. The message is clear: If you want to disapprove a VECP, you cannot later, or previously, incorporate the change that it proposes.

The second factor the Commanding Officer grappled with was just who had the idea first. Internal program office documents clearly indicated the end-users didn't want the components. Further review of specification documents found that the components were part of the

specifications both before *and after* the negotiations of the contract for the additional aircraft.

Lastly, no documentation requiring deletions for the components could be found which had been forwarded to the contractor prior to their letter of intent to study the proposed deletions. The botton-line was that the contractor had taken the initiative and action to propose the change even though the government initiated the idea. The Board of Contract Appeals has made it clear that it is the party acting upon the idea who ultimately gets credit for the same. As one such decision put it, priority of conception without the flesh of positive action is a meaningless exercise in the world of VECP.[4] A VECP may thus be based on a government idea previously conceived but not affirmatively implemented prior to receipt of a VECP based on the idea.[5]

Board of Contract Appraisals

In the aircraft component case described previously, the first "positive act" (on the part of the government) between the parties was issuance of the Stop Work Order. But, the order was issued subsequent to the contractor's notification of a forthcoming VECP. In the Commanding Officer's mind, the contractor took the first positive action to get the "government's attention" via the letter of intent to study the VE idea. Simply because the government was forced to act by the contractor's letter is not reason enough to deny the contractor a share of the savings due them. The Board of Contract Appeals made this point clear when it stated:

> Interpreting the clause to permit the government to hold out the offer of reward to induce contractor's cost reduction proposals but escape sharing the resultant savings on the basis that it thought of the idea first, although not enough to use it until induced to do so by contractor action, would serve neither justice nor the policy intended by the (value engineering) clause.[6]

If the previous two arguments in favor of the contractor weren't enough, the "clincher" is the well-established fact that, when in doubt, the VEI clause is always interpreted in favor of the contractor.

The courts and boards have consistently stressed that VEI provisions should be construed in favor of the contractor. In a landmark case on this very issue, the Armed Services Board stated:

> If any underlying philosophy may be said to run through the various decisions of the Board and the Court of Claims in the field of value engineering rewards, it is that the provisions of the Value Engineering Incentive Clause are to be liberally interpreted in favor of the contractor. As frequently explained in other opinions, this attitude represents merely a practical approach to derive maximum benefit for the Government from the value engineering program generally. If the sharing provisions were to be interpreted and administered strictly with an eye to holding down rewards, the incentive to propose or urge adoption of money-saving devices and procedures would, for practical purposes, be eliminated, the flow of suggestions would dry up, and the program would die.[7]

If a senseless requirement makes its way into a contract, the government should thus reward the contractor for bringing it to its attention rather than condemn it for attempting to get its "unfair share." Nevertheless, the VEI provision and its "clarifying" language of FAR Part 48 is not the easiest guidance to interpret. Open-minded management of the VE program is thus not only desirable but imperative.

Three Lessons

In summary, there are three lessons to be learned from our aforementioned case of the "costly components." The first may seem obvious but, nevertheless, is often ignored; namely, know *what* you are buying. The VECPs to delete unnecessary items which the government already knew about, while in all probability are valid VECPs, nevertheless are

almost always the subject of controversy. Even if approved after long ensuing battles among contractual parties, they leave a bitter taste in the mouths of some who are not easy converts to the VE mindset.

The second lesson is that whoever has a potential VE idea should establish the right to that idea early on. In other words, *take action*. Not only do suppressed ideas create later confution if another claims the idea as one's own, but VE savings can rapidly diminish over time if not implemented in a timely manner. Here again, the VE program can get "bad press" if the government sits on an idea only to be capitalized upon by an astute contractor.

Lastly, all attempts should be made to maximize VE incentives for contractors. This is not to say, however, that one should call anything and everything a VECP. Only valid VECPs submitted in the spirit and guidance of the FAR should be submitted and approved. Only then will the potential for disagreement be minimized.

The Value Engineering Incentive program is complex to administer and understand. It has been the subject of numerous litigation cases further attesting to the ambiguities surrounding it. What must always be in the forefront of the minds of those in the acquisition world is that value engineering can be a win-win relationship between the government acquiring the items it needs and contractors providing them. That is, however, *if* each party works together in building mutual understanding of how the program can work to each other's benefit.

Endnotes:

1. FAR 48.101(b)(1).
2. FAR 48.101(b)(2).
3. Covington Industries, Inc. (1968) ASBCA No. 14432, 71-2 BCA, Paragraph 8981.
4. Xerox Corp., (1973) ASBCA No. 16374, 73-1 BCA, Paragraph 9881.
5. Ibid.
6. Syro Steel Co., (1969) ASBCA No. 12530, 69-2 BCA, Paragraph 8046.
7. Airmotive Engineering Corporation, ASBCA No. 17130, 74-1 BCA, Paragraph 10,517.

ARE YOU HEADING FOR ORGANIZATIONAL BANKRUPTCY?

minimums: (1) reports by your supervisors that the training is directly influencing the quality of your products, and (2) improvement of safety figures.

Many of us believe employee attitudes toward their work and their fellow employees, including the management team, are directly related to their skills and knowledge levels. A well-trained work force is the only work force one can afford anymore.

You are going bankrupt (remember, employee skills and knowledge are resources too), if you do not have a strategy to upgrade your training efforts. You will go bankrupt if you do not continuously improve the processes as all systems decay without proper care.

Well? How does your organization look? Do you see the requirement for change? What about your hidden fac-

tory? You have one, you know! Can you have someone look at your product and processes? A surprising number of your employees feel the ones you have are inadequate. Remember when you were in the ranks at a lower grade? Remember what you had to go through to get trained? It's still the same.

Are you going bankrupt?

Want to bet?

THE ROLE OF ANALYSIS IN C/SCSC

quirements, the analyst should know the decision context. As a minimum, this requires learning who decisions-makers are and the kinds of decisions they face. To help the decision-maker evaluate the quality of the information, the analyst should know the database and the system that controls it. To help the decision-maker use the information, the analyst should be skilled at applying an assortment of analysis techniques that effectively transform data into information and be wary of the many associated assumptions and pitfalls of those techniques.

While specific examples have focused on the role of the C/SCSC analyst as a system or performance evaluator, the general concepts apply to all analysts.

Appendix—Selected C/SCSC References

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End Notes

1. Department of Defense Instruction 7000.2, "Performance Measurement for Selected Acquisitions," June 10, 1977.

2. David S. Christensen, "Management Control Systems Theory Is Useful Tool," *Program Manager,* November-December 1989, pp. 20-23.

3. Anthony Webster, "C SCSC Lessons Learned Theoretical Framework," *Program Manager,* July-August 1988, pp. 13-22.

4. Russell L. Ackoff, "Management Misinformation Systems," *Management Science,* 1967, p. 508.

5. Edward R. Tufte, *The Visual Display of Quantitative Information,* Cheshire, Conn., Graphics Press, 1983.

6. Barbara G. Taylor and Lane K. Anderson, "Misleading Graphs: Guidelines for the Accountant," *Journal of Accountancy,* October 1986, pp. 126-135.

7. Paul Steinbart, "The Auditor's Responsibility for the Accuracy of Graphs in Annual Reports: Some Evidence of the Need for Additional Guidance," *Accounting Horizons 3,* September 1989, pp.61-70.

8. Ibid.

9. Abraham Kaplan, *Conduct of Inquiry,* San Francisco, Chandler Publishing Company, 1964, p. 28.

Time for a Relook at
WEAPON SYSTEM WARRANTIES
The Shotgun Approach Needs to Be Replaced With More Accurate Targeting

Brigadier General Lewis E. Curtis III, USAF

For the last 5 years, the Congress has mandated specific warranties on weapon systems. As required by law, these warranties have been applied across-the-board to new weapon system contracts, regardless of the maturity of the system, market environment, or contract type. Experience shows this blanket requirement, while not difficult to legislate, can be a nightmare to implement.

Weapon system warranties *do not make sense* in every situation. The "broad-brush" approach taken by the Congress may have been necessary to initiate such a sweeping change in the way the Department of Defense did business but now, with the benefit of 5 years' experience under the law, it is time to revisit requirements of the law and its application.

The Law

Beginning January 1, 1985, 10 USC 2403 mandated warranties on weapon system procurements. This law was, to a great extent, the culmination of the Congress' frustration with numerous instances of the defense industry providing multi-million dollar systems that didn't perform as advertised. The law states that "weapon systems" must contain a threefold guarantee: 1) the item must conform to the specified design and manufacturing requirements, 2) it must be free from defects in material and workmanship, and 3) it must conform to specified essential performance requirements. If the contractor does not meet the requirements of these guarantees, he must take corrective action at no additional cost to the government, or pay the government to take these actions. *Weapon System* is defined as an item that can be used directly by the armed forces to carry out combat missions and costs more than

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$100,000 each or has a total procurement cost of more than $10 million. Waivers to these requirements are permitted 1) in the interest of national defense, or 2) if the guarantee would not be cost-effective. Waiver authority is no lower than the Assistant Secretary of the military department, and includes a requirement for congressional notification. The law applies only to weapon systems in mature full-scale production and provides the flexibility to tailor these warranties to meet specific needs of individual programs.

Growing Pains

The across-the-board requirement for warranties, while possibly necessary to begin institutionalizing the warranty process, has caused problems. Most severe has been applying the law of a sole-source environment. Weapon system warranties were applied to follow-on contracts to purchase additional lots of existing systems. Because earlier procurements of these systems did not include Title 10-type warranties, this attempt to change horses in midstream is resulting in interminable negotiations, meaningless essential performance requirements, and warranties. While cost-effective, these have been weakened so significantly that their overall effectiveness is questionable.

Sole-source acquisitions pose a variety of unique challenges. Without pressures of the marketplace, difficulties of assuring a fair and reasonable price are magnified. In the warranty area, too, dealing with a single-source requires special considerations. The government leverage in assuring a reasonable assessment of risk by the contractor is significantly reduced. Without competition, the contractor will take an extremely conservative approach, which translates into high-warranty costs or low-performance parameters, or both. Flexibility given by the law to negotiate is a double-edged sword which, in a sole-source environment, can lead to extended negotiations where the contractor can wear down the government until it gets a meaningless, watered-down warranty simply to satisfy requirements of the law.

Use of Waivers

The waiver authority under the law should provide relief in this situation. However, experience shows the level of waiver approval authority and reasons for waiver, as well as congressional reporting requirements, discourage waiver submission. Six waivers have been approved Air Force-wide since enactment of the law.[1] One case required three ʒc' missions; most required months for approval. Nevertheless, a GAO report criticized the Air Force for conducting extended negotiations rather than requesting a waiver.[2]

The program manager is placed in a near untenable position. If he requests a waiver based on a non-cost-effective warranty, he probably would be directed to re-tailor essential performance requirements until they were cost-effective. The program manager could accomplish this in many ways; i.e., substituting other requirements, reducing warranty duration, or changing values of existing requirements. This tailoring is permitted by the law and, indeed, provides necessary flexibility for the government and contractor to agree on risk aspects involved in any warranty. On the other hand, at what point do these negotiations in the sole-source arena become fruitless? This is a judgment call but, given the history of waiver requests, negotiations usually will continue.

Recent Legislation

The fiscal 89 DOD Appropriations Act included a requirement for the Under Secretary of Defense for Acquisition (USD(A)) to justify the use of firm-fixed-price research and development contracts for major systems or subsystems greater than $10 million. The USD(A) further required justification for using all fixed-price-type research and development contracts greater than $25 million.[3] Given the concurrent nature of many of our programs, cost-type contracts will likely continue into early production—beyond the initial production exempted from the warranty statute. At least one large defense contractor believes risks inherent in its program justify a cost-type production contract.

Where does that leave weapon system warranties? Warranties should be a motivator to encourage contractors to provide the government with a quality product. Quality must be designed in. The Air Force requires early warranty planning: a sample warranty provision identifying the essential performance requirements and remedies that will be required in the production contract is to be placed in the DEM/VAL RFP; a model provision covering all warranty terms and conditions is included in the FSD RFP.[4] The essential performance requirements are derived from contract (system) specifications and are measurable characteristics of system performance in the field.

Cost-type production contracts negate benefits of a warranty. Under cost-type contracts, the contractor is required to give only "best efforts."[5] Failure of the contractor to meet the terms of a warranty covering systems delivered under a cost-type contract would be unenforceable since the government, through its control of funding made available to the contractor, controls the amount of effort expended by the contractor—again, the contractor is required to give only best efforts. Additionally, if specifications are not firm, the basic premise of a warranty is undermined—if the contractor does not promise the government anything other than his best effort, we cannot expect him, at the same time, to "guarantee" anything else.

The Federal Acquisition Regulation (FAR) forbids inclusion of warranties in cost-reimbursement contracts unless authorized by agency regulations. The Department of Defense FAR supplement severely restricts using warranties in cost-type contracts, but exempts weapon systems covered by the warranty statute.[6] In spite of this exemption, the same principles that apply to cost-type, non-weapon system contracts also should apply to cost-type weapon system contracts. In essence, warranties simply do not make sense under cost-reimbursement contracts.

Time for a Change

Changes are needed in the application of weapon system warranties. It is time to refine the criteria for their use, taking into account the market environment and risk assessment (read contract type). Waivers should be more actively pursued when appropriate.

The following scenarios highlight some of the problems in a blanket application of weapon system warranties.

The first scenario, a firm-fixed-price production contract negotiated in a competitive environment, contains the fewest warranty pitfalls. In this situation, a design has been finalized, development completed, and risk reduced to manageable levels. Performance data has been accumulated during full-scale development (FSD) to the extent that essential performance requirement values can be negotiated with each contractor, with the pressure of competition assuring a realistic appraisal of risk and a reasonable price from each contractor.

The second scenario is a program "down-selected" to a single-source before production. Here, the negotiation of an effective warranty is more difficult. The contractor has no incentive to accept risk and every incentive to move as much risk as possible to the government. Resulting proposals are pessimistic, worst-case projections with a corresponding price tag. The end of long, drawn out negotiations is often a warranty that is only a shell of the original.

The last scenario adds "cost plus" to the equation. As stated, cost-plus

FOCAL POINT

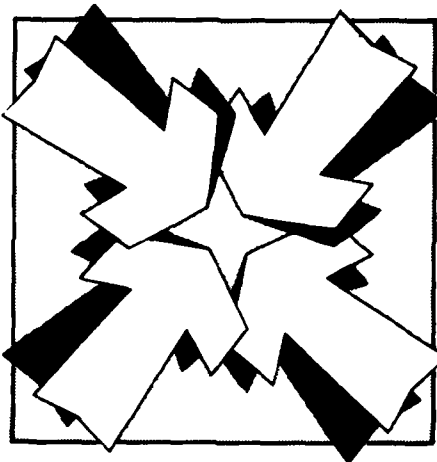## An Alternative to the Program Executive Office In Chemical Nuclear Matters

Major Denise M. Bachman, USA
Mr. Joseph Cartelli

World-wide political reforms, arms control treaty negotiations, and U.S. deficit reductions will impact Army budget plans and acquisition practices. Legislators have been making decisions to reduce force structure and spending on weapon systems.

One policy implemented to pro-actively respond in part was May 1989 establishment of the Focal Point for Chemical warfare/nuclear, biological, and chemical (CW/NBC) defense (excluding medical), providing a management system for coordinating and executing that area.

The Under Secretary of the Army chartered the Commander of the U.S. Army Chemical Research, Development, and Engineering Center (CRDEC) as Army Focal Point. Responsibilities encompassed management and coordination of all research, development, and acquisition (RDA) pertaining to CW/NBC defense materiel. See Chart 1.

The Focal Point replaced the Program Executive Office (PEO) for chemical/nuclear matters, disestablished in January 1989. Brigadier General David A. Nydam is Commander of CRDEC; deputy commanding general, U.S. Army Armament, Munitions, and Chemical Command (AMCCOM); and Army Focal Point for CW/NBC Defense. Unlike a typical program executive officer, he has two chains of command. His focal-point charter authorizes direct communication with the Army Secretariat, Army Staff, major commands, subordinate commands, other Services, federal agencies, and appropriate members of the international community on RDA matters concerning CW/NBC defense. Notwithstanding, Brigadier General Nydam works for the Commander of AMCCOM and reports through his chain of command on any issue, policy or problem affecting the

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military mission for which AMCCOM is responsible. He is responsible for directing program managers for smoke/obscurants, binary, and NBC defense systems as the Focal Point; yet, unlike a PEO, the Commander, AMCCOM, is the senior rater for program managers.

Many Responsibilities

Brigadier General Nydam is authorized to conduct program reviews and function as Army program decision authority, authorized in AR 70-1, Systems Acquisition Policy and Procedures, for non-major CW/NBC defense programs. He is authorized to reprogram 6.1-6.3A funds within assigned program elements, and reprogram 6.3B-6.7 funds within and across assigned program elements up to limits imposed by the Congress. He is responsible for setting priorities for mission area programs through the mission area management plan, materiel acquisition integration team, and long-range RDA plan (LRRDAP); in this respect, the Focal Point will facilitate planning, programming, budgeting, and execution for CW/NBC defense with deputy chiefs of staff for Headquarters, Department of the Army, and U.S. Materiel Command. He will ensure all program aspects are coordinated for the Assistant Secretary of the Army for Research, Development, and Acquisition (ASA(RDA)).

CHART 1. CW/NBC DEFENSE PROGRAMS

— Retaliatory CW materiel (incapacitating, lethal, and antipersonnel weapons).

— NBC defense materiel (detection & warning; collective and individual protection, and decontamination equipment).

— Smoke/Obscurant systems (including anti-materiel).

— NBC survivability (hardness, compatibility, and decontaminability) of all mission essential materiel.

The Focal Point will testify before the Congress on the Army's non-medical NBC defense program, and will support and defend program and budget plans for CW/NBC defense facility construction and operation. As the Focal Point integrates programs across all commands, it is essential that he has oversight regarding all programs in the NBC mission area, and related programs in other mission areas such as tech base, combat service support and fire support. He has been appointed proponent for AR 70-71, NBC contamination survivability of Army materiel, previously assigned to the Deputy Chief of Staff for RDA. This regulation, under revision, will delegate the Focal Point tasking authority to army staffs, agencies and MACOMs. The Focal Point will review Army programs to ensure survivability requirements are incorporated throughout the RDA life cycle of all mission essential materiel.

At the Pentagon

To facilitate communication between DA/ASA (RDA) and the Focal Point, a liaison office comprising a lieutenant colonel and a civilian is at the Pentagon. A one-person focal-point liaison office is assigned to AMC headquarters. These provide DA, ASA (RDA) and AMC information regarding issues and status of the CW/NBC defense program; conversely, these contacts provide the Focal Point with current information regarding Department of Defense and Department of the Army budget policies, and congressional inquiries affecting the CW/NBC defense RDA program.

One major aspect of implementation of the Focal Point concept is its impact on Joint Services acquisition, research, and development in the CW/NBC field. Pursuant to DOD Directive 5160.5, the Army is designated lead agency for all military services on chemical matters. Establishment of the Army Focal Point ensures all resources devoted to CW/NBC RDA are identified, coordinated, and prioritized within the RDA community, and that a consistent and coherent DOD position is presented to the Secretary of Defense and the Congress. As proponent for AMCR 70-67, Chemical/Biological Defense Equipment Acquisition, the Focal Point ensures RDA is not duplicated by the Joint Services. Brigadier General Nydam is the Army member of the Joint Logistics Commanders chemical biological panel, and designates an Army respresentative to the Joint Service review group. The Focal Point organization will enhance military capabilities in this Joint Services support role.

Fewer Acquisition Dollars

The Focal Point for CW/NBC Defense faces the same demands as other Program Executive Officers confronted with fewer acquisition dollars. A centralized and coordinated program should enable the Focal Point to develop and foster CW/NBC defense throughout the Army, benefitting AMC, the Army and the soldier in the field.

TIME FOR A RELOOK AT WEAPON SYSTEM WARRANTIES

contracts require only a contractor's best efforts. While incentive or award fees act as motivators, their strength is limited by the funds available. The government, through its funding, controls the contractor's effort. In any attempt at warranty enforcement, the lack of concrete specifications is coupled with the contractor's argument that his inability to meet an essential performance requirement is the result of inadequate funding by the government. Ideally, the warranty clause is placed in a competitive full-scale development contract as an option to be exercised along with the production options, thus maximizing government leverage. With a cost-type FSD and, possibly, early production, risks are too great. Even with competition, in a cost environment the contractors are competing in "promises" only.

Summary

The time has come to revisit the requirement for weapon system warranties. The shotgun approach needs to be replaced with more accurate targeting. Weapon system warranties are not appropriate for all weapon system procurements. Broad classes, such as sole-source and, under the recent law, cost-type acquisitions should be exempt unless benefits can be clearly shown. Other individual acquisitons should be able to waive warranty requirements when it makes good business sense to do so. Waiver procedures should be streamlined to facilitate the use of warranties only when appropriate. The Congress has allowed programs flexibility to tailor warranty contents to the procurement; it is time to allow programs the flexibility to decide whether or not to apply weapon system warranties themselves.

Endnotes

1. Per SAF AQCS.

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3. USD(A) Memorandum, dated September 25, 1989, "Under Secretary of Defense for Acquisition Approval of Certain Fixed-Price Type Contracts."

4. AFR 70-11, December 1, 1988, Paragraph 5.

5. FAR 52.232-20, Limitation of Cost Clause.

6. DFARS 246.705(a).